AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

Reg. U. S. Pat. Off

Published Weekly
Volume 72
Number 18

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OFFICES

Philadelphia—Chestnut & 56th Sts., Phone Sherwood 1424
New York—239 W. 39th St., Phone Pennsylvania 6-1100. Chicago—Room 1116 London Guarantee & Accident Bldg., Phone Franklin 9494. Detroit—814 Stephenson Bldg., Phone Madison 2090. Cleveland—609 Guardian Bldg., Phone Main 6860. Boston—301 United Shoe Bldg., Phone Liberty 4460. San Francisco—444 Market St., Room 305, Phone Garfield 6788. Long Beach, Cal.—1595 Pacific Ave., Phone Long Beach 612-238.

Cable Address ..... Autoland, Philadelphia

SUBSCRIPTION RATES: United States, United States Possessions, and all countries in the Postal Union, $1.00 per year; Canada and Foreign, $4.00 per year. Single Copies, 25c.

Member of the Audit Bureau of Circulations
Member Associated Business Papers, Inc.

Entered as second-class matter Oct. 1, 1925, at the post office at Philadelphia, Pa., under the act of March 3, 1879.
Automotive Industries—The Automobile is a consolidation of the Automobile (monthly) and the Motor Review (weekly), May, 1902; Dealer and Repairman (monthly), October, 1903; the Automobile Magazine (monthly), July, 1907, and the Horseless Age (weekly), founded in 1895, May, 1918.

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CHILTON COMPANY
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Executive Offices
Chestnut and 56th Streets, Philadelphia, Pa., U. S. A.

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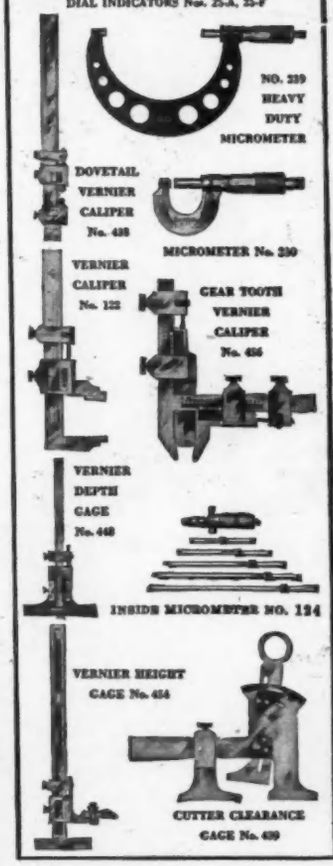
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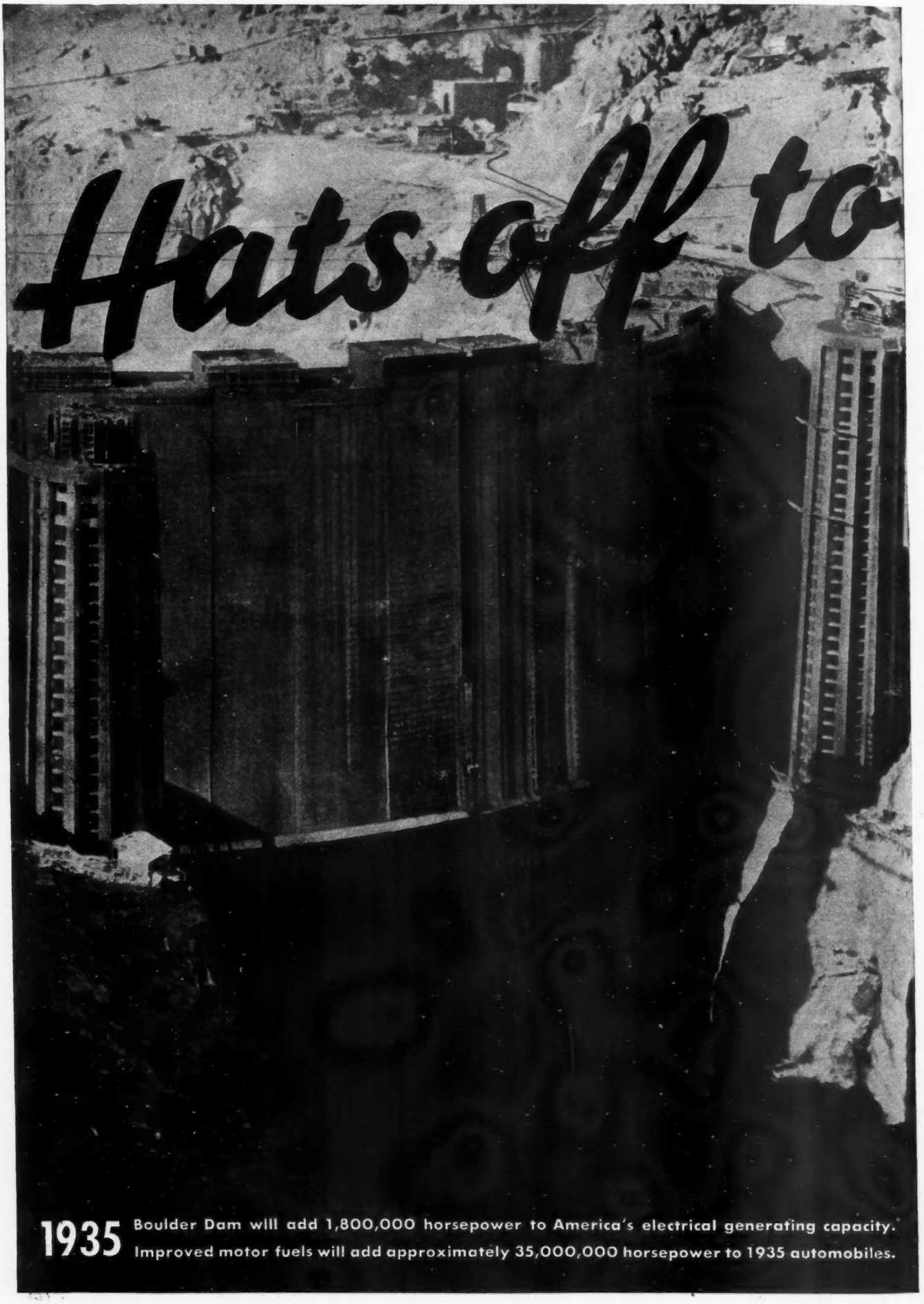

Hats off to
1935
Boulder Dam will add 1,800,000 horsepower to America's electrical generating capacity.
Improved motor fuels will add approximately 35,000,000 horsepower to 1935 automobiles.

AUTOMOTIVE INDUSTRIES

Vol. 72, No. 18 ▫ THIRTY-SEVENTH YEAR ▫ May 4, 1935

Strike Curtails Operations

Suppliers Hit by Toledo Walk Out; Chevrolet Shuts 5 Plants

DETROIT, May 2—The strike at the Chevrolet plant in Toledo, now in its second week with no definite indication of when or how it will be settled, to date has resulted in the closing of Chevrolet and Fisher plants in five other cities with the prospect that the St. Louis plant employing 3,200 will close this evening.

This will leave three assembly branches operating—Baltimore, Buffalo and Oakland—in addition to the main plant at Flint, which is said to have probably the biggest supply of transmissions on hand.

Meanwhile the crippling effects of the strike are fanning out over a wide area as suppliers received stop orders on Chevrolet parts and material.

A conference of Edward F. McGrady, Assistant Secretary of Labor; W. S. Knudsen, GM executive vice-president; and F. J. Dillon, A. F. of L. general organizer, was held here today, but at its conclusion both Mr. Knudsen and Mr. Dillon refused to make any statement, while Mr. McGrady could not be reached.

Fred Schwake, business agent for the local on strike in Toledo, has reported to the strike committee at the Chevrolet plant, that GM is equipping a plant in Muncie, Ind., for the production of Chevrolet transmissions. Mr. Schwake visited Muncie and on his return said that many workers from the Toledo plant already were in Muncie, that 25 strikers had gone there for picket duty at the GM plant and at Warner Gear. He advised tearing down the Muncie plant if it begins operations to take jobs away from Toledo.

A split with the A. F. of L. was hinted at a meeting of the Toledo union Wednesday night. Mr. Schwake said that they wanted action and were awaiting word from Mr. Green and Mr. Dillon. The strike will not be settled in Washington, Mr. Schwake stated, but by the men on strike, adding that "we ask no odds of the A. F. of L."

Assembly plants in Tarrytown, Kansas City, Janesville and Atlanta were closed by the management for lack of transmissions, laying off a total of 7200 workers. Earlier in the week the Cleveland Fisher plant which makes Chevrolet stampings, including turret tops, was closed by the company. Subsequently union workers are reported to have agreed not to return to work until the Toledo strike was settled. Between 8500 and 9000 workers were laid off in Cleveland. The Norwood, Ohio, plant, employing over 2000, was closed by strikers whose demands paralleled those at Toledo with the additional one that the management agree not to ship cars assembled there into territories served by other GM plants which might be closed by labor troubles.

Reports coming in indicate that departments in suppliers plants working on Chev-

(*Turn to page 596, please*)

Hupp Meeting Postponed

DETROIT, May 2—The organization meeting of the newly appointed Hupp board scheduled for Tuesday of this week was postponed until tomorrow, but the indications were the meeting would not take place before Monday of next week. Many of the principals are in Washington in connection with the stock delisting matter pending before the SEC. It is understood all members of the new board have promised to serve and one of their first acts will be the election of a new president.

The rival stockholders' fight for control of Hupp Motor Car Corp. terminated abruptly late Thursday, April 25, when amicable settlement was reached under guidance of Federal Judge Edward J. Moinet by agreement on a coalition board of directors.

The following board of directors was proposed: Archie M. Andrews, present chairman; Frank S. Lewis, Toledo attorney; J. Walter Drake, former chairman and rival of Andrews; Vernon Drum, production manager; William B. Mayo, automotive engineer; Harvey Campbell, vice-president of Detroit Board of Commerce; former governor Alex J. Groesbeck and Hal H. Smith, counsel.

Participating in the final conference were both Andrews and Drake. Suppliers were represented by McKee Robison, assistant secretary, Hayes Body Corp., as an observer.

April Output Near 470,000 Units; Labor Situation Fogs May Outlook

by Harold E. Gronseth

Detroit News Editor, Automotive Industries

The retail market for motor cars continues to show surprising vitality with the sales trend still on the upgrade. Sales officials see no signs of the peak as yet and predict that May will see new weekly records. April wound up with a burst of strength, the final week showing gains general among the various makes of passenger cars. Field reports are highly optimistic, particularly from the West and Southwest, where recent rains have relieved the dust situation.

So well has the retail demand held up that manufacturers planned May production programs just about on the par with April, which is believed to have set a new high mark since August, 1929. In the neighborhood of 470,000 cars and trucks were produced in the United States and Canada during April, comparing with 373,108 units in April of last year, which was the peak production month in 1934.

In view of the disturbed labor situation no estimate can be made at this time of the May output. Had not the strike broken out in the Chevrolet plants, indications were that May would run close to April and if the current strong retail demand was sustained might even have topped the April figure by a slight margin, since Chevrolet, the second largest producer, was just getting into full swing. The strike already is

(Turn to page 596, please)

Sloan Terms Proposal to Limit Automobile Exports as Cotton Aid Fallacious Theory

The proposal of Chester C. Davis, Agricultural Adjustment Administrator, that automotive exports be limited as an aid to increasing exports of cotton was dealt a thwacking criticism this week by Alfred P. Sloan, Jr., GM president, in which the Administrator's suggestion was termed a "practical illustration of the fallacy of the 'theory of scarcity' which has hypnotized our economic thinking" and as being "true to the thinking of the moment . . . to correct the difficulty by more regulation—the universal cure-all."

Referring to figures released by the United States Chamber of Commerce showing that automobile exports last year jumped 120 per cent while cotton exports declined 30 per cent, and based upon the proposal of George Peek that all American foreign trade be government controlled, Mr. Davis proposed that this nation make Europe buy more agricultural products by refusing to sell Europe all the American manufactured products it wants. The theory, it was explained, is based upon the idea that Europe has a limited number of dollars with which to buy American products, and since Europe is spending most of these dollars for manufactured goods there is little left for agricultural products.

Mr. Sloan's statement, which he called "Economic Wonderland," follows:

"My attention has been called to the suggestion made by Chester C. Davis, Agricultural Adjustment Administrator, as reported in the morning press of April 25. Mr. Davis finds fault with the growing increase of motor car exports and the growing decrease in cotton exports. True to the thinking of the moment, he proposes to correct the difficulty by more regulation . . . the universal cure-all. I would suggest that he look into the fundamentals and find out what is really happening. Why are the world markets absorbing an increasing number of American motor cars, and why are they absorbing a decreasing amount of American cotton, It is simply because they can buy greater value of motor cars in the world markets from America than from anywhere else. Now as to cotton. The circumstances are directly opposite. Other producers of cotton are glad to sell at lower prices, hence they get the business. The number of dollars available in foreign exchange is, to be true, a factor. But far more fundamental is the question as to whether the deal is possible irrespective of foreign exchange. It certainly is not, because it is not profitable to the buyer. The whole situation is very plain.

"But let us look into the matter further. Why is it that 40 to 50 per cent of our cotton was formerly sold abroad and why are conditions now so different? It is a practical illustration of the fallacy of the 'theory of scarcity,' which has hypnotized our economic thinking. That thinking prejudices our whole national economy. Normal recovery is retarded. The automotive industry suffers relatively, but because of its recognized high efficiency and large volume possibilities as compared with competing manufacturers in other producing countries, it is still able to exist and to sell its products abroad, but the unfortunate producer of cotton for export has not the same fundamental advantages. I sympathize with him. I sincerely hope that something will be done. But if it is not, his suffering will be short lived because he can not continue to exist in the face of such a policy.

"What is suggested is nothing more or less than to regulate out of the world markets American motor cars that represent American labor, American material, even a certain amount of American cotton itself, and try to substitute more cotton that we cannot sell at the price we must ask.

"I make these observations in the hope of discouraging what will turn out to be another excursion into economic wonderland, and in behalf of the automotive industry as well as of national recovery in both of which I am profoundly interested."

Alfred P. Sloan, Jr.

Canadian RR's Seek Curb On "Unregulated" Trucking

As a further experiment on the part of Canadian railways to meet "unregulated competition of highway freight transportation" the Canadian Pacific Railway and the Canadian National Railways will inaugurate another extension of the freight pickup and delivery service in eastern Canada. The joint announcement over the names of Alistair Fraser, K. C., vice-president of the Canadian National Railways, and George Stephen, vice-president of the Canadian Pacific Railway, says that the new service will provide for four different tariff ratings, depending on the class of traffic to be handled. The new scale of tariffs is expected to be put into effect May 1. The railways will use cartage agencies already in existence to avoid any capital expenditure in the acquiring of new facilities.

$30,150,500 of Dodge Bonds Paid This Week

The Chrysler Corporation on Wednesday paid off its entire remaining outstanding funded debt of $30,150,500 of 6 per cent debentures of Dodge Bros., Inc., which were called for redemption. The amount involved was $32,562,540, which included besides the principal, the premium of $1,507,525 and accrued interest of $904,515.

To effect this redemption, Chrysler Corp., through its own treasury, recently arranged an aggregate credit of $25,000,000 with certain of its depository banks in the form of one, two, three, four and five year notes, and made provision to pay off the balance of $5,150,000 and the premium out of its own funds, as reported by *Automotive Industries* in the March 23 issue.

As a result of wiping out of this funded debt the corporation, after the first of the year, will effect an interest saving of approximately $1,200,000 annually.

Proposed State Laws Hit Finance Co. Monopolies

A veritable rash of automobile finance company regulatory legislation has broken out in state legislatures, particularly in the middle and far west. The majority of the proposed measures are aimed at monopolistic practices and would prohibit manufacturers or wholesalers requiring car dealers to finance installment contracts through one designated person or company.

States where such legislation has been introduced include California, Illinois, Utah, Washington, Idaho, Michigan, Pennsylvania, Oregon and Montana. In many instances the bills not only provide for future prohibition of such contractual practice but also would void existing contracts. The bill presented to the Illinois legislators would require automobile finance companies to procure a license and pay an annual fee of $100; the Pennsylvania measure prescribes a fee of $50 annually. This is similar to the Indiana law recently enacted.

March Production, Employment, Payrolls Gains Range from 10% to 33% Over 1934

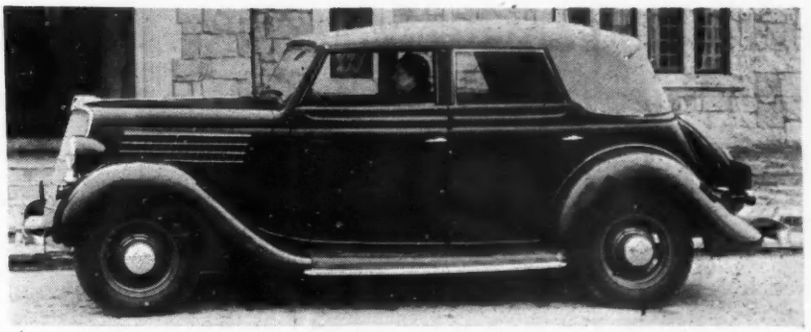
Federal Reserve Business Indexes
1923 — '25 = 100

	Adjusted			Unadjusted		
	Mar. '35	Feb. '35	Mar. '34	Mar. '35	Feb. '35	Mar. '34
Production	106	105	80	130	112	98
Employment	114.4	114.1	103.7	119.5	117.5	108.4
Payrolls	....	....	....	113.7	110.3	98.1

Packard Reports Net Loss; Now on Profitable Basis

A net loss of $1,210,162 for the first quarter of the current year has been reported by the Packard Motor Car Co. This compares with a net loss of $1,257,020 for the corresponding period of last year. The loss, it was explained, was principally due to expenses incident to preparing the plant for production of Model 120. However, the company is now operating at a profit according to Alvan Macauley, president.

Current assets as of March 31 were $16,441,847 including $6,261,596 cash, and current liabilities were placed at $4,159,018. The company's cash account dropped to $6,261,596 from $12,395,681 reported at the close of last year. Offsetting this decrease is an increase in inventories of $3,374,188; tool expenditures for new lower priced car, $1,198,734; machinery and equipment for new car, $1,109,723, and increased accounts receivable of $545,311 due to expanded operations. The company's surplus is now $10,403,974 after effecting a transfer of $10,000,000 from capital to surplus which was approved by the stockholders at the annual meeting, April 15.



A new all-weather Ford V-8 convertible sedan. The top, of tan-colored rubber interlined cloth, can be lowered and folded, covered by a boot. The two center pillars are removable and may be stowed away in the car. Seat cushions and backs are in leather or bedford cord.

NY Job Insurance Law Provides Weekly Benefit of $15; Dovetails With U. S. Bill

Beginning Jan. 1, 1936, all employers in New York State of four or more persons (with certain exceptions which have no automotive application) for 13 or more calendar weeks in a year, will be subject to the unemployment insurance act which became law last week.

The new law is intended to dovetail into the federal bill now pending in Congress and provides for a payroll tax of 1 per cent in 1936, 2 per cent in 1937 and 3 per cent thereafter. The money will be paid into the Federal Unemployment Trust Fund and requisitioned by the State as needed for benefits.

The tax applies to all compensation paid to employees, except non-manual workers paid at a rate of more than $2,500 annually or $50 per week, and all employees whose pay is subject to tax are eligible to benefits. Payment of benefits will not begin, however, until 1938.

The law is of the pooled fund type as contrasted with the Wisconsin statute where the contributions of each employer are kept separately. Consequently, there is no immediate incentive for employers to provide stable employment since the employer who gives regular employment pays exactly the same tax as one who provides work sporadically. However, the law requires the State Advisory Council, which it creates and which consists of three representatives of employers, three of labor and three of the public, to study the operation of the act with a view to classifying employers on the basis of the regularity of employment and to report as to the practicability of rating them so the tax can be adjusted to the risk.

All contributions to the fund are made by employers and the act specifically limits the liability of the State to the money paid into the fund by employers. The law also voids any agreement by an employee to pay part of the tax levied on his employer.

The law will be administered by the Industrial Commissioner of the State Labor Department who is empowered to create as many districts and district employment offices as he sees fit. To be eligible for benefits, an individual must be totally unemployed, must register as unemployed at an unemployment office, must have had not less than 90 days employment subject to the act within the preceding 12 months or not less than 130 days in the preceding 24 months, and must not have been unemployed for more than a year.

Benefits are payable at the rate of one week of benefits for each 15 days of employment in the preceding 52 weeks after a waiting period of three weeks. However, no more than five weeks of waiting period may be required in any calendar year. If a worker is discharged for misconduct or if he is not working because of a strike, lock-out or other industrial controversy, he is eligible for benefits only after a waiting period of 10 weeks.

The amount of benefits is set at 50 per cent of full-time weekly wages but not exceeding $15 or less than $5 weekly. Total benefits in any consecutive 52 weeks shall not exceed 16 times the benefits for one week of total unemployment.

No benefits will be paid to those who refuse to accept a job for which they are reasonably fitted by training or experience. Benefits will be paid, however, if the job offered is conditioned on the employee's joining a company union or which would interfere with his joining or retaining membership in any labor organization. He need not accept a job that is open because of a strike or a lock-out, or one that is out of the State, or one in the State that requires traveling an unreasonable distance unless expenses are paid, or one which calls for sub-standard wages, hours or working conditions.

March New Car Sales 47% Above Same Month of '34

March retail sales of new passenger cars ran 47 per cent ahead of sales for the same month of last year and jumped 209 per cent above sales for the corresponding period of 1933, according to preliminary figures issued by the Bureau of Foreign and Domestic Commerce.

The aggregate value of the first quarter sales was 64 per cent above that for the similar period of last year and 154 per cent higher than two years ago. The preliminary adjusted index of the Bureau shows March as 94.5, using 1929-31 as 100, compared with 86.5 in February and 75.0 in January of this year.

Thermoid First Quarter Sales 32% Over Last Year

Sales of Thermoid Co. and wholly-owned subsidiaries for the first quarter of 1935 showed an increase of more than 32 per cent over the same period of 1934, according to Fred E. Schluter, chairman.

In March, Thermoid and subsidiaries shipped more tonnage than in any month in the company's 50-year history, excepting one in March, 1929, which exceeded March, 1935, by only 1½ per cent. The gain in March this year over March last year was 28 per cent.

Youngstown Announces Yoloy, a New Alloy

A new alloy steel has just been announced by the Youngstown Sheet & Tube Co. This new product, known as Yoloy, is a nickel copper alloy steel, and is said to have an exceptional resistance to corrosion, high tensile strength combined with high ductility, workability and weldability.

Yoloy steel is produced in sheets, strips, plates, bars, shapes, wire and seamless pipe.

Cadillac-La Salle Adds 112 New Dealers in April

One hundred and twelve new dealers joined the national Cadillac-La Salle retail organization between April 1 and April 24, J. C. Chick, general sales manager for Cadillac, has announced.

Senate Committee Votes NRA Extension, Ban Price Fixing, Curb Code Application

WASHINGTON, May 2—Amended to bar price fixing except in natural mineral resource industries and to limit the application of codes to interstate commerce, the Senate Finance Committee yesterday approved a resolution extending the National Industrial Recovery Act to April 1, 1936, by which time, it is expected, its constitutionality will have been determined by the Supreme Court.

The President and NIRB Chairman Richberg were opposed to action along this line, insisting on the passage of the administration bill extending the act for two years in greatly modified form. Nevertheless, following the approval of the resolution, Senator Harrison, chairman of the Senate Finance Committee, and a strong Administration supporter, said: "I think this is the best way out of the situation and that is why I championed the plan before the committee."

From the standpoint of automotive manufacturers, the resolution is a more satisfactory answer to the problem than the Administration bill since the latter would have set up much more rigid labor provisions than those in the present law. So far as price protection is concerned, it doesn't make a great deal of difference whether the resolution or the bill is enacted, since last week Senator Harrison offered amendments to the Administration bill barring private price fixing and the control of production and distribution.

Efforts to get an interpretation of just what the ban on price fixing comprehends have proved unsuccessful. As a result there is a sharp difference of opinion as to whether it means the elimination of cost-recovery provisions, such as in the APEM code, and of the marketing rules of the dealer code. There are also differences as to what codes would be eliminated by the proposed prohibition of code regulation of businesses wholly in intrastate commerce. These latter differences center around the question of whether commerce affecting interstate commerce actually is interstate commerce within the meaning of the constitution.

In this connection, it is important to note that argument began before the Supreme Court today in the poultry case in which the constitutionality of the hour and wage provisions of NIRA and the codes is challenged. This case is expected to determine whether it is good law that employer-employee relations come under the commerce clause because they may affect interstate commerce. If the Court decides that such relations are outside of the power granted Congress by the commerce clause, NRA will receive a vital blow as will apparently the Wagner bill also.

Incidentally, there is talk of an attempt to force consideration of the Wagner bill, which has the approval of the Senate Labor Committee, ahead of NRA legislation and also adding the Wagner bill as an amendment to whatever NRA legislation is enacted. It is believed here that efforts along either of these lines would fail. Meanwhile, leaders of organized labor, called into conference here this week, are increasing their pressure for the passage of the bills on the A. F. of L.'s program.

The amendments to the Administration bill offered by Senator Harrison last week would prohibit code provisions permitting price fixing and the control of production and distribution, limit the power of code authorities and increase the powers of the Federal Trade Commission.

Code "Clean-Up" Proviso Amendment OK Expected

Approval by NRA of the amendment revising the present provision in the dealer code covering the liquidation of obsolete cars, is anticipated this week.

The amendment provides that upon written application to the State Advisory Committee by a dealer or dealers and with the approval of that committee and the manufacturer concerned, the National Control Committee may authorize sales of new cars, production of which has been or is about to be discontinued, at less than regular delivered prices. The National Control Committee also is authorized to fix and to change the maximum reduction, a power that the present code does not grant to the dealers but which they quite commonly exercised.

It is understood that the amendment is interpreted to confer power on the National Control Committee to call upon the manufacturer concerned for data substantiating the statement that the car is out or is going out of production.

March New Car Registrations

	1935	1934
Auburn	482	186
Buick	5,393	4,962
Cadillac	433	516
Chevrolet	55,733	50,796
Chrysler	4,283	1,879
De Soto	2,583	866
Dodge	17,506	9,657
Ford	94,986	46,200
Graham	1,323	1,173
Hudson	1,844	2,223
Hupmobile	795	317
Lafayette	1,216	167
LaSalle	500	153
Lincoln	142	178
Nash	1,212	1,418
Oldsmobile	14,755	4,602
Packard	928	421
Pierce-Arrow	59	144
Plymouth	34,615	30,918
Pontiac	13,449	7,259
Reo	317	222
Studebaker	3,304	4,164
Terraplane	4,589	4,153
Willys	974	325
Miscellaneous	56	388
Total	261,477	173,287
Total—1st Quar.	568,727	329,416

Boyd's "Research" Out

"Research" is the title of a book by T. A. Boyd, head of the Fuel Section of General Motors Research Division, which has just been published by D. Appleton-Century Co., New York, at $2.50. The subject of research is dealt with from every angle and in a very readable style. We expect to publish a review of the volume in an early issue of *Automotive Industries.*

T. C. Smith Elected

Temple C. Smith, engineer, motor vehicle and construction apparatus of the American Telephone & Telegraph Company, has been elected a vice-president of the S.A.E., representing transportation and maintenance activities.

South Bend Celebrates Studebaker Co. Reorganization; Honor Hoffman, Vance

The spotlight was thrown on Studebaker Corp. last week when South Bend staged a three day festival to celebrate the successful reorganization of the 83-year-old automobile company and to mark "the end of the depression for the city." Highlight of the event was the victory dinner in the University of Notre Dame dining hall on Friday evening, given as a testimonial to Paul G. Hoffman, president and Harold S. Vance, chairman of the board, and their associates who had accomplished "the tremendous task of rehabilitation."

Attended by over 1200 national, state and local leaders, the gathering was addressed by prominent speakers including Alvan Macauley, president of Packard Motor Car Co. and president of the Automobile Manufactuers Association, Governor Paul V. McNutt of Indiana, Robert Lincoln O'Brien, chairman of the U. S. Tariff Commission, Congressman Samuel B. Pettengill, Dr. R. D. Morand, deputy speaker of the Canadian House of Commons, Federal Judge Thomas W. Slick and others.

Mr. Macauley termed the occasion "unique in industrial history." He said that Messrs. Vance and Hoffman accomplished what was believed in industry could not be done and they accomplished it because they did not know it couldn't be done.

"Studebaker stands higher today with the public than ever before," said Mr. Macauley. "The A.M.A. wishes Studebaker the success that it has demonstrated worthiness of. It will have to fight for what it gets, but it has proved its ability to fight."

He voiced encouragement for the independent motor car company saying "I have no doubt that they can successfully compete. The big companies have some advantages but also some big disadvantages." Compactness, ability to change direction

AT SOUTH BEND'S STUDEBAKER CELEBRATION: Upper left, Paul V. McNutt, Governor of Indiana, and Harold S. Vance, Studebaker chairman; center, Alvan Macauley, president of Packard and of the AMA; upper right, Vincent Bendix and Paul Hoffman, Studebaker president; lower left, A. J. Chanter, Pierce-Arrow president; Alfred Reeves, vice-president of the AMA and L. P. Fisher, GM vice-president; lower center, E. H. McCarty, Nash president; John H. Lloyd, and Roy Faulkner, Auburn president; lower right, J. E. Fields, Chrysler vice-president; Judge Thomas W. Slick, and A. G. Bean, White chairman.

quickly, more cooperation, less politics, one product and one name, and the ability to work closer with distributors and dealers were points stressed in favor of the smaller automobile manufacturer. Big companies in other industries have not overwhelmed nor excluded the smaller ones, Mr. Macauley pointed out.

"No segment of our business life has shown greater courage than the automobile industry," said Congressman Pettengill. "It was the chief factor in pulling us out of the let-down following the world war and it leads the way today." He predicted that wages would go higher, not as a result of politics or humanitarian moves, but as result of management that will enable men to earn more so that they can buy more.

Mr. Vance and Mr. Hoffman expressed their gratitude for the manner in which the city and the nation had received the company's reorganization.

Paying high tribute to his co-workers, to former president A. R. Erskine and to Knute Rockne whose leadership had inspired the sales force, Mr. Hoffman said, "We are trustees of the name and reputation of Studebaker. We are going to try to recapture the spirit of the Studebaker brothers and will rededicate the institution to the principles that have kept it prosperous for 83 years.

"We can't go too far, too fast," said Mr. Hoffman, "but I can report that we are making definite progress. Our sales in February totaled 4,300 units; in March, 5,300; and in April, 6,300. Exports take 16 per cent of the company's output." He said that 85 per cent of the distributors and dealers who were selling Studebaker when the company went into receivership are still selling Studebaker cars, and that the men in the plant averaged almost 10 years with the company, average almost 40 years of age and that there were more workers in the plant who were over 50 than under 30.

Among the leading lights of motordom who attended the banquet were: A. G. Bean, chairman of White Motor; Vincent A. Bendix, president Bendix Aviation; Arthur J. Chanter, president Pierce Arrow; Harley Earl, director of art and design for General Motors; Roy Faulkner, president Auburn Motor; Joseph Fields, president Chrysler Sales Corp.; L. P. Fisher, president Cadillac Motor; Earl H. McCarty, president Nash Motors; and Alfred Reeves, vice president and general manager of AMA.

Hudson Profit Reflects Production Control Plan

Hudson Motor Car Co. reports a net profit of $235,610 for the first quarter of this year, compared with a loss of $802,845 in first quarter of 1934. This is the biggest profit for any quarter since 1931, which, in addition to heavier volume, is attributed to larger per unit profit made possible by the production control plan inaugurated at the start of the current production season.

A. E. Barit, vice-president and general manager, said that April profits exceeded March and that current cash holdings approximate $8,000,000 with no current bank loans. Working capital position, in addition to increase provided by sale of notes, was augmented through operations to extent of approximately $1,000,000 during first quarter. Aside from current accounts the company has no obligations to meet until Aug. 1, 1936, when $250,000 of the $6,000,000 notes recently sold mature.

Reflecting the production control plan, Hudson's employment averaged about 10,000 monthly throughout the winter, compared with a low of 3000 and a peak of 15,000 during winter of 1933-34.

Third Quarter Steel Prices Being Studied

Shipments to Automotive Plants Continue Despite Labor Upsets of Week

With decisions on third quarter prices and the steel industry's code only a few week's distant, developments are being interpreted largely in the light of their effect on these coming events. Much depends on whether the slightly slower pace in this week's steel mill activities is to be attributed to merely temporary interruptions in the call for steel from automotive consumers or whether it denotes that the peak of assemblies has been reached and passed. According to the American Iron and Steel Institute, only 43.1 per cent of ingot capacity is employed this week, as compared with 44.6 a week ago and 44.4 a month ago. Finishing mills are reported to be operating at a slightly lower rate than they did a fortnight ago.

From what could be learned, labor troubles in automotive plants have caused no postponements of shipments thus far. Representative tonnages of hot and cold rolled strip steel were contracted for a few weeks ago for shipment this month. That these complications tend to retard the development of additional business is obvious. Commitments for full-finished sheets, however, are being made principally with a view to insuring deliveries when needed.

Steel producers are confident their code will survive the present difficulties and that Congress will finally approve this type of code legislation. Some of the producers, moreover, are hopeful that the code will undergo minor revisions to facilitate their making upward price changes, now possible only four times a year, whenever they should become necessary and thus put them more nearly on an equal footing with buyers. The latter now enjoy three months' price protection, but because price reductions can be filed at any time, can avail themselves of these. Some of the larger steel consumers are quite outspoken in their determination to offer resistance to price advances at this time. In some quarters the impression prevails that the whole problem of price revision will be permitted to rest until the last quarter of the year.

Pig Iron—Lake Superior ore prices remain unchanged. Pig iron demand continues at a good rate, automotive foundries being the most prominent in the market, although restricting for the most part their takings to requirements for current or nearby melts.

Copper—"Blue Eagle" bookings are on the uptrend. General confidence that by mid-summer orderly conditions in the world's copper markets will have been established as the result of the restriction plan, is imparting an undertone of firmness to the domestic market. Sir Aukland Geddes, former Ambassador to the United States and chairman of the board of the Rio Tinto Co., Ltd., one of the world's largest producers, at a meeting of the stockholders of that company said American stocks were small enough not to frighten anybody and American consumption was improving. He said he was hopeful that prices would soon rise to a remunerative level.

Tin—The McReynolds bill, which would authorize the President to impose a 6 cents per pound tariff on imports of tin ore when United States mines were producing ore at the rate of 1,500 tons a year, is not taken seriously in the trade. There is virtually no tin production in the United States and development of a domestic smelting industry would be a matter of years. The market for spot Straits, amid moderate demand, opened this week at 50⅝ cents.

Lead—Under the stimulus of high silver prices, supplies of lead, a by-product of many of the silver mines, are steadily growing. Demand from storage battery manufacturers is good. The market is steady.

Ford Gets 3 New Patents for Pump, Tappet, Engine

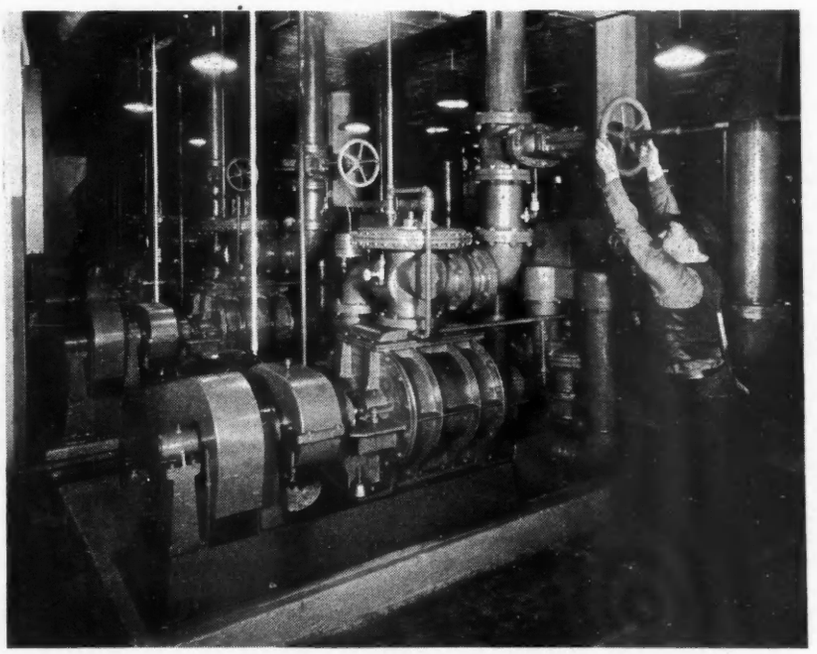
Henry Ford has figured quite prominently among patentees of late. Three patents were issued in his name on April 23. Of these one covers a water pump comprising an impeller wheel in a pump chamber bolted to the cylinder head and relates specifically to lubricating means for the pump; a second relates to the familiar Ford valve tappet with thin cylindrical wall having helical-shaped openings therein, of such width and lead angle that while the weight of the tappet will be materially reduced, yet it can be finished in a centerless grinder. The third covers an engine clutch of the disk type. Several weeks ago Mr. Ford was granted a patent on an engine in which the crankshaft main bearings are formed on the outside surfaces of the circular crank webs.

Canadian Drawbacks, Contents Quiz Crux

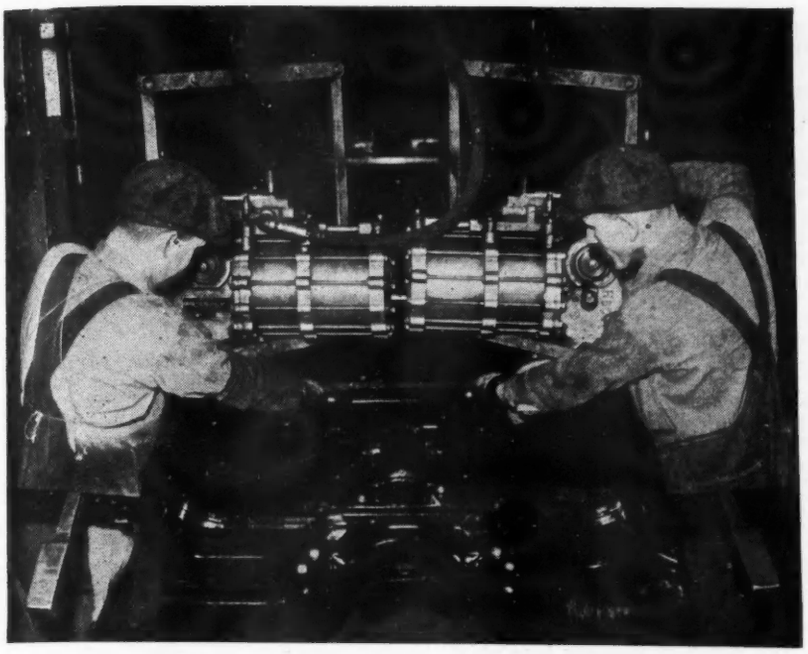
Dominion Tariff Board Opens Inquiry With Trip Through Ontario Plants

A thorough nation-wide inquiry into the automobile industry and into gasoline prices is contemplated by the Canadian Tariff Board, whose itinerary within the next two weeks will take them to the various automobile plants in western Ontario, after which they will go through Western Canada to the Pacific Coast to listen to representatives against the present prices both of cars and gasoline. It is expected that on the board's return to Ottawa, Ont., about the first week of June, some public hearing will be fixed before final consideration is given to reports on the two references from the Minister of Finance.

Charges have been made that in some of the automobile factories cars are assembled and not manufactured, but against this is the fact that the industry of manufacturing the lower priced cars in Canada has been firmly established. What the board is required to determine is whether or not the customs duty against foreign cars is being abused in this country; whether or not those duties are needlessly high. The question is tangled, for in the consideration of customs duties enters the problem of the variety and intricacy of drawbacks allowed for certain imported materials. The board, in the reference to it by the Minister of Finance, has even been instructed to consider at what prices automobiles should be sold at retail in Canada. Not only is there deep interest in this inquiry from Canadian car users as well as manufacturers, but



The above photograph shows the fuel mixer from which all engines that are being "run in" in the Dodge engine testing department are supplied. City gas is used as fuel for this purpose and in the apparatus shown is mixed with atmospheric air in the proportion of 1 to 5.5. All of the engines are connected to this mixer by piping. Twelve hundred engines are being run in and 16,000 cu. ft. of gas used per day.



The beginning of the assembly line at Pontiac. Rivetting the first brackets on the chassis frame by means of continuous pressure rivetters. None of that ear-splitting noise that goes with the hammer type of rivetter.

manufacturers and exporters of cars in the United Kingdom have a stake in this investigation. They are desirous of having established a minimum Empire content of 75 per cent, and of having that content requirement rigidly enforced. Into this question of content, too, enters the matter of drawbacks. If an Empire content of 75 per cent were fixed and invariably enforced it would be of some advantage to British exporters, for the many American branch plants established in this country to avail the American exporters of the privileges of the British preference tariff for export to the British Dominions and colonies might have some difficulty, it is argued, and competing with United Kingdom exporters in the matter of content. There is little expectation that any very drastic action will be taken, but there is a considerable demand for some readjustment of the present situation.

Ford Co. Constructing $4,000,000 Coke Plant

Ford Motor Company is spending $4,000,000 for construction of two batteries of by-products coke ovens. This brings the company's total outlay for the modernization and expansion program launched several months ago to $27,000,000.

Contract for construction of the two batteries of 61 ovens each on Miller Road, Dearborn, site of the present Ford ovens, has been awarded the Koppers Construction Co. of Pittsburgh. The new ovens do not represent expansion of present capacity but will replace half of the 240 now operating. Their construction, however, will bring the Ford coke-making equipment up to date and will facilitate the manufacture of steel in the steel plant now being built. The construction contract involves $2,000,000 while the other $2,000,000 will go for other work on the oven plant.

Other projects now under way at the Ford plant are a hot strip steel rolling mill to cost $6,100,000; a sheet steel cold finishing mill, east of the present steel mill, $3,460,000; new ingot handling equipment, $230,000; modernization of foundry and installation of furnaces and other equipment for the production of cast alloy steel parts, $675,000; reconstruction of one of the large blast furnaces to increase its capacity, $800,000; and expansion of the main power house, $4,600,000.

In addition, new tools and machinery are being installed in every department to bring the plant capacity up from 6,000 cars every 24 hours to 6,000 cars every 16 hours.

NIRB Approves Wheel, Rim Code Amendment

The National Industrial Recovery Board has announced approval of an amendment to the wheel and rim manufacturing industry code, an APEM supplement, exempting export sales from provisions of the supplementary code with regard to prices, discounts, deductions, allowances, extras or methods and/or terms of sale.

Patrick J. Moohan

Patrick J. Moohan, works manager of the Nash Motors Co. died at his Kenosha home last week. Mr. Moohan, who was 56 years old, was a native of Detroit and burial was made in that city.

For seven years Mr. Moohan was works manager for Buick at the Flint plant but left that organization in 1916 to become associated with the Nash company.

Supreme Court Dismisses Spielman Case On Technical Grounds Without Review

The United States Supreme Court this week in an unanimous opinion read by Chief Justice Hughes dismissed the Spielman case, *cause celebre* of dealer code litigations, on technical grounds without going into the merits of the case.

The net effect of the Court's decision is that the Spielman company was not entitled to the injunction it sought but should have awaited actual prosecution before taking its case to a higher court.

Approximately a year ago the Spielman Motor Sales Co. of New York City sought an injunction in the U. S. District Court to restrain William C. Dodge, New York County District Attorney, from carrying out a threatened criminal prosecution for alleged violations of the NRA dealer code and the now invalid Shackno, New York enabling statute, involving trade-in allowances on used cars. The Spielman plea for the injunction was heard by a three judge federal court which denied the restraining order and at this point the Spielman company carried its fight to the highest tribunal.

In its decision dismissing the case the Supreme Court held that Mr. Dodge, as attorney for New York County, was a state officer and the proper person to prosecute the Spielman organization, but that the District Court, which heard the appeal, was without authority to assume jurisdiction and therefore reversed the decree of the lower court. The Supreme Court in its decision pointed out that the Spielman company challenged the state statute as "repugnant to the Constitution of the State, by reason of an improper delegation of power, and also as effecting a deprivation of liberty and property without due process of law in contravention of the Fourteenth Amendment of the Constitution of the United States."

Reviewing the point of whether the Spielman complaint stated a cause of action within the equitable jurisdiction of the district court the Supreme Court stated it has held in the past that "it must appear that 'the danger of irreparable loss is both great and immediate;' otherwise the accused should first set up his defense in the state court, even though the validity of the statute is challenged," and then went on to say: "The bill (Spielman's complaint) contained general allegations of irreparable damage and deprivation of 'rights, liberties, properties, and immunities' without due process of law, if the statute were enforced. But the bill failed to state facts sufficient to warrant such conclusions, which alone were not enough. . . . Aside from the statement of general and unsupported conclusions, the case presented by the bill was the ordinary one of a criminal prosecution which would afford appropriate opportunity for the assertion of appellant's rights. . . . The bill should have been dismissed upon the ground that it failed to state a case within the equitable jurisdiction of the District Court. The decree is modified accordingly, and, as modified the decree is affirmed."

Strikes Curtail Operations

(*Continued from page* 589)

rolet business had been forced to close or curtail operations. Among these are Kelsey-Hayes Wheel Co., which closed down its Chevrolet wheel line; the Murray-Ohio Co., the Fort Smith (Ark.) Body Co., Eaton-Detroit Metal Co., Trumbull Steel, Corrigan-McKinney, and Otis Steel. Toledo parts plants supplying Chevrolet also are curtailing.

Union leaders are said unofficially to be boasting that by the end of the week all General Motors units will be affected by strikes due to the tying up of key plants. In Washington, where he conferred with the A. F. of L. President William Green, and with Secretary Perkins, Detroit General Organizer F. J. Dillon deprecated the spread of the strike, but implied there might be a general walkout. He implied this might be accomplished by strikes at key plants, indicating that Federation unions were particularly strong at Toledo, at the Delco-Remy plant in Anderson, Ind., and the Bendix plant in South Bend.

The transfer of Pontiac transmission manufacture to the Buick plant at Flint brought an immediate reaction from the Federation local at that factory. Following a union meeting Tuesday, a conference with the Buick management was requested. Harlow H. Curtice, Buick president, told the union representatives that the company's production facilities were not being used to circumvent the Toledo strike, explaining that the transfer of the manufacture of Pontiac transmissions was a part of GM's plan for the expansion of Flint operations, that it was planned to build 1936 Pontiac transmissions with the new Buick facilities which involved an expenditure of $1,500,000 and that the strike merely hastened the move.

Detroit union headquarters state that this explanation was unsatisfactory. Following all-day conferences on Wednesday, the union agreed to continue work this week but voted to give the executive board authority either to call a sympathy strike or to resume negotiations on Monday in the event the Toledo strike is not settled. The company agreed to stop production of Pontiac transmissions Saturday and in the meantime not to increase substantially production of these units nor to make any Chevrolet transmissions. The Buick plant has been producing transmissions for Pontiac, Olds, LaSalle, Cadillac, and GMT.

In connection with the Flint situation, Robert Passage, president of the Flint Federation of Labor and head of the truck drivers' union, said that his organization would stop work if any transmissions could be traced from Buick to Chevrolet plants.

Local union headquarters issued a statement saying that "despite the refusal of the General Motors Corp. to negotiate with its Toledo employees, members of the United Automobile Workers Federal Labor Union No. 18384 who are on strike are holding up in splendid shape.

"W. S. Knudsen, executive vice-president, and other officials had insisted that if the men were given an opportunity to vote upon the proposals of the company they would be willing to accept them and return to work. This was unmistakably disproved on Friday, April 26, when F. J. Dillon at a mass meeting of 1600 strikers personally conducted a vote on the question. Each one of the proposals, including the offer of a 5 per cent wage increase, was turned down unanimously, and the ALB's election system received particularly vehement criticism." Resolutions were passed at the meeting favoring the immediate resumption of negotiations "with the end in view of negotiating to a logical and mutual conclusion all disputed points at issue," and requesting further conferences with the management.

The statement that 1600 strikers attended the Toledo meeting last Friday is challenged by reports from that city stating that not more than 700 strikers have attended any mass meeting. Moreover, it is learned that the strikers expressed themselves by a standing vote, it being indicated from the platform beforehand that anyone who didn't stand was a rat and that the standing vote method was being used to determine if there were any such animals present.

Continued labor troubles in Toledo are causing some discussion of the future of parts manufacture in that city. There is talk that the labor situation may force parts manufacturers to move bringing decentralization for a reason not contemplated by the economic planners.

In Toledo the latest move to aid the strikers and most significant to the industry was that to bring about a committee representing eleven other plants here which have signed agreements with the United Automobile Workers Federal Union No. 18384.

A conciliatory attitude has been taken by William S. Knudsen, executive vice-president of the General Motors Corp., according to a statement which he issued commenting upon the closing of the Fisher Body plant in Cleveland as forced by the Toledo strike.

April Output Near 470,000

(*Continued from page 589*)

affecting assembly operations of Chevrolet and if continued much longer will mean a complete cessation of the company's production, which, of course, will seriously affect the industry's May output.

Sales of new passenger automobiles in the United States during March totaled 261,477 units, according to R. L. Polk & Co.'s figures on new car registrations. This was an increase of 97.77 per cent over March a year ago, when the total was 132,212 units, and 53.26 per cent ahead of the 170,615 new cars registered in February, 1935.

New passenger car registrations in the United States for the first quarter were 568,727 units, nearly double the 288,341 registered in last year's opening quarter.

Commercial car and truck sales in March reached 41,511 units for the nation, 22.51 per cent ahead of the 33,884 total in March, 1934. February registrations were 34,797 units, exceeded by 19.27 per cent in March. First quarter commercial sales were 111,067 units, up 37 per cent from 81,263 a year ago.

Factory shipments of Hudson-Terraplane 1935 models to March 31 totaled 35,459 including export and Canada, against 30,586 cases of the 1934 models by the corresponding date of last year. April shipments approximate 11,500 cars.

With retail deliveries of 10,055 cars during the week ended April 27, Plymouth for the second consecutive week established a new weekly record, showing a gain of .7 per cent over preceding week and 29.8 per cent over the corresponding week a year ago. It brought Plymouth sales for the year to date to 126,943 units, a gain of 41.8 per cent over the same 1934 period.

DeSoto deliveries likewise went to a new high for the week with a total of 716 Airstream and Airflow cars, making the biggest week since September, 1933. To date this year DeSoto deliveries total 8069, a gain of 212.1 per cent over the corresponding period of last year.

Buick reports steady upward swing in new car sales. Deliveries of 2552 units during the second 10 days of April exceeding the first 10-day period by 52 per cent and the corresponding period last year by 60 per cent. It was the best volume for any corresponding April period since 1931. Unfilled orders at the factory increased 25 per cent during the month to 5000 and the present production pace is being maintained.

Hupp retail deliveries doubled in April, the best comparative showing so far this year, bringing total deliveries to date to 2589 cars against 1,156 for the like period of last year. Hupp's unfilled orders increased 10 per cent during the month to 2396 cars. Production was materially increased during last half of the month so that shipments through April 30 this year exceeded 3000, compared with fewer than 1700 in the same 1934 period.

Production of 20,451 Oldsmobiles in April set a new all-time record, 11 per cent ahead of March and double the volume of April last year. It exceeded the schedule originally planned by over 2000 cars. So far this year Oldsmobile has built and shipped 67,239 cars.

Chrysler dealers during week ended April 27 delivered 1218 Chryslers and 3991 Plymouths, a total of 5209 units, also a new high and a gain of 6.6 per cent over the preceding week. Deliveries by Chrysler dealers during the first 17 weeks of 1935 totaled 13,102 Chryslers and 48,777 Plymouths or, combined, 61,879 units, an increase of 54.2 per cent over the similar 1934 period.

Dodge dealers during the week ended April 27 delivered 7851 Dodge and Plymouth passenger cars and 1392 commercial cars and trucks, a total of 9243 units against 9088 in the preceding week. It was a gain of 68.1 per cent over the corresponding week last year. Used car and truck deliveries during the week totaled 8189.

Marmon Receivership End Sought by Indiana Courts

Efforts are being made in Indiana courts to end the receivership of the Marmon Motor Car Company as quickly as possible. Administrative costs of the receiver so far have totaled $90,000. Original receivers, Ferdinand Barnickel and Robert A. Adams, have received $15,500 each since being appointed in May, 1933. Another item indicated that $2,100 had been spent for an appraisal of the property, but no court record shows any valuation having been calculated.

A 3 per cent dividend has been paid to creditors. A part of the real estate and buildings of the defunct company has been leased and the court is seeking a sale for the machinery and other personal property of the company so that the receivers may be discharged.

At the close of the receivership, it is planned to return all property not disposed of to owners, stockholders and creditors.

Chrysler Dingmen Strike

Fifty-seven of the 62 dingmen employed by Chrysler went on strike Tuesday as a protest against the corporation's breaking in new men for this highly skilled work. The men also asked that their hourly rate be increased 10 cents to $1.35. There are said to be only about 250 men of this trade in Detroit.

Further Work Hour Cuts Would Reduce Income Despite High Pay Rate, AMA Says

In a letter to Donald R. Richberg, Chairman of the National Industrial Recovery Board, the AMA announced that the industry during the past 13 months has paid the highest hourly wage rates in its history, has increased payrolls 131 per cent above 1932, and is paying more to labor per car produced than it did in 1929.

However, Alvan Macauley, president of the association, pointed out in the letter that, because of the marked shortening of working hours required by the industry's code, it has not been possible to pay weekly wages and annual wages approaching those of 1929.

Average work hours per week under the code have been cut 13 a week from the 1929 average—from 45.6 to 32.6 hours. As a result, despite higher rates and higher relative payrolls, the individual's average weekly pay envelope has contained only $24.70 during the 12 months ending in March instead of $32.74 in 1929. These figures were compiled from reports made by members of the industry in connection with their code.

The code sets 40 hours as the annual average permissible weekly hours with an absolute maximum of 48 hours for any one week. But, Mr. Macauley pointed out, any number of uncontrollable causes, including the impossibility of fully regulating the flow of materials from parts suppliers, makes it impossible for the industry to approach the allowable maximum working time.

He maintained that if the workers are to regain the weekly wage of 1929 they must be allowed to work more hours per year. Further limitation of hours will only reduce weekly pay, and greater flexibility than now obtains is needed.

Addressing himself to the proposal of a 40-hour limit which could be exceeded by paying time and one-half for overtime, Mr. Macauley said: "The great mass of these automobile manufacturers could not avail themselves of the permission to employ their men for longer hours at the higher rate of pay for the simple reason that their financial condition does not permit it. To enable them to pay overtime it would be necessary to raise the prices of the cars to the public. This would certainly bring about a reduction in sales. That in turn would mean smaller volume of employment and, so, lower earnings for the workers."

The actual average hourly wage rate paid during the year ended March 31, 1935, was 75.7 cents. In 1929 the average was 71.2 cents. Every month in the 1934-35 period has shown a higher average than any month in 1929, when the industry paid higher factory wage rates than any other major employing group.

Noting the achievements as outstanding contributions to the program of national recovery, Mr. Macauley said in the letter that they had been possible only because the industry had been able to increase efficiency and sales by giving the public "more for its money"—greatly improved cars at practically unchanged prices.

Chrysler Net Profit Triples '34 Quarter

Declare Extra Dividend Of 25 Cents per Share Sales Were $149,949,900

Making the greatest production record for any quarter in its history, the Chrysler Corporation reported net earnings for the January-March period of this year of $9,163,182, which compares with $3,303,850 for the corresponding period of 1934. This first quarter profit was after allowance for a non-recurring charge of $1,507,525 incident to the retirement of $30,150,500 of Dodge Brothers bonds.

First quarter earnings were equivalent to $2.12 per share on 4,332,327 shares of capital stock, and corporation directors declared an additional dividend of 25 cents per share on the basis of earnings.

The corporation's balance sheet of March 31 shows current assets of $105,784,670 (including $48,674,715 cash), against current liabilities of $44,696,233 and a working capital of $61,088,437. These balances compare with current assets of $87,088,519, current liabilities of $37,686,371, and a working capital of $49,402,148 for the first quarter of last year.

Sales amounted to 247,631 units with a value of $149,949,990, which compares with 167,212 units of $95,287,305 for the same three months of 1934. First quarter sales to the public totaled 159,265 cars and trucks, against 105,822 for the same three months of 1934. Export sales rose 62 per cent above the comparable period of last year.

GM to Spend $3,500,000 Enlarging Pontiac Plant

General Motors will spend $3,500,000 in the next few months for expansion of production facilities for Pontiac automobiles at Pontiac, Mich.

Expansion of the Fisher Body plant which supplies bodies for Pontiac will cost $2,500,000. In addition $1,000,000 will be spent in enlarging the Pontiac Motor Division plant. The enlargement will include new buildings, machinery and equipment. Construction work has been started.

"The rapid increase in demand for Pontiac cars has exceeded expectations for the year," H. J. Klingler, president, said. "This is bound to result in further demand being made upon the plant during the next year. We are moving to meet this expected increase in business."

The Pontiac plant ran at capacity during April in an effort to reduce the heavy bank of unfilled orders from dealers, turning out 18,749 cars for the month and bringing total production to date up to 70,558 units, or 92 per cent of the entire 1934 production.

NADA Distributes Dealer Survey Forms

Forms for reporting operating data for 1933, 1934, and for each month of 1935 are being distributed to dealers by the National Automobile Dealers Association in connection with the continuing survey of the financial aspects of automobile retailing which the organization is inaugurating.

The NADA has asked the NRA Research and Planning Division to make an independent study of dealer problems on the basis of the facts developed by the survey, and other authorities including Ernst & Ernst will be drawn upon in connection with methods and conclusion. The association's own Division of Trade Statistics will compile the data.

Verville in Development Section of Air Bureau

Alfred V. Verville of Detroit, who for more than 20 years has been engaged in the design and construction of aircraft, has joined the Development Section of the Bureau of Air Commerce, Department of Commerce. For the past eight months Mr. Verville has been chief of the Bureau's Manufacturing Inspection Service, which is in charge of the examination and approval of aircraft, engines and accessories, as to airworthiness. Lawrence V. Kerber of Tulsa, Okla., an aeronautical engineer of the Department of Commerce, has been appointed acting chief of the Manufacturing Inspection Service.

Jan.-March Earning Statements

Car Companies	1935	1934
6 companies reported	+$30,673,467	+$31,675,414
Chrysler Corp.	+ 9,163,182	+ 3,303,850
Auburn	— 451,597	— 857,394
Packard	— 1,210,162	— 1,257,021
Yellow Truck & Coach	— 239,968	+ 7,315
Total 10 companies	+$37,934,922	+$32,872,164

Parts Companies	1935	1934
19 companies reported	+ $7,127,716	+ $3,717,641
Minneapolis-Honeywell	+ 33,858	— 21,425
Borg-Warner	+ 1,383,845	+ 863,931
Young Spring & Wire	+ 520,932	+ 311,883
P. R. Mallory	+ 271,144	+ 4,632
Motor Wheel	+ 258,124	+ 269,171
Spicer Mfg. Co.	+ 134,946	+ 2,704
Gabriel Co.	— 21,623	— 24,456
Total—26 companies	+ $9,708,942	+ $5,124,081

Business in Brief

Written by the Guaranty Trust Co., New York, exclusively for Automotive Industries

General business continued to improve last week, with increased volumes of both wholesale and retail trade. Despite unfavorable weather conditions, Easter business is estimated at from 8 to 12 per cent above that of last year. The outlook in the Southwest has been brightened by the outlook for the spring crops and the distribution of government funds in the drought areas.

Business Trend Upward

The Guaranty Trust Company's index of business activity for March stands at the preliminary figure of 74.2, as against 73.7 for the preceding month and 73.8 for a year ago. The company's index of wholesale commodity prices on April 15 was 53.1, as against 50.1 a month earlier and 54.7 a year earlier.

More Car Loadings

Railway freight loadings during the week ended April 20 amounted to 610,905 cars, which marks an increase of 23,220 cars above those during the preceding week, an increase of 19,200 cars above those a year ago, and an increase of 114,393 cars above those two years ago.

Chain Store Sales Steady

The index of store chain sales compiled by the "Chain Store Age" for March was 95.4, based on the March average for 1929-31 as 100, as against 95.8 for February and 91.4 a year ago.

Current Output Rises

Production of electricity by the electric light and power industry in the United States during the week ended April 20 was 1.7 per cent above that in the corresponding period last year.

Production Volume Level

The summary of business conditions in the United States during March published by the Federal Reserve Board stated that the volume of production during that month, which usually rises seasonally, changed very little. There was a considerable increase in wholesale prices of farm products and foods. There was an up-turn, partly seasonal, in residential building during March and the first half of April.

Employment, Wages Up

The level of employment last month increased 1.5 per cent, while payrolls rose 2.5 per cent, according to the Bureau of Labor Statistics. March is the fourth successive month in which gains have been reported in employment and payrolls.

Fisher's Index

Professor Fisher's index of wholesale commodity prices for the week ended April 26 stood at 81.8, as against 81.5 the week before and 81.7 two weeks before.

Federal Reserve Statement

The consolidated statement of the Federal Reserve banks for the week ended April 24 showed a decline of $53,000,000 in money in circulation and an increase of $29,000,000 in monetary gold stocks.

New German Device Guards Against Driver Drowsiness

A device to protect automobile drivers from falling asleep at the wheel has recently been placed on the German market, according to a report from L. L. Schnare, U. S. Consul at Hamburg, made public by the Commerce Department.

The device consists of a false rim or covering for the steering wheel which is connected by electric wires with the horn and ignition and arranged in such a manner that the removal of the pressure of the driver's hand on the rim will instantly sound the horn and shut off the ignition. The operation is based on the assumption that drowsiness in the driver relaxes the muscles of the hands on the wheel. A switch is provided to shut off the device in case it is not needed. It is also claimed that the device can be used as a safeguard against theft. When set for this purpose, the horn will sound immediately when the starter key is introduced in the ignition switch and the ignition will not function. It is stated that the device can be easily mounted on any automobile.

New Finance Co. Offers 24 Month Service; Charge 5%

Twenty-four month financing of new car sales is being offered in Philadelphia by the First Credit Corp. of that city. The financing charge is 5 per cent per year of the unpaid balance plus fire, theft and $50 deductible collision insurance. The paper is bought without recourse to the dealer. The down payment required is one-third or more.

By taking only new car paper and by limiting itself to the better credit risks, the company obviously is directing its efforts at the cream of the business. The fact that the company does not handle used car paper has been the subject of some criticism among dealers on the score that the plan lacks completeness for this reason. Dealers also point to the no-recourse feature eliminating the profits on reserves which they get under the repurchase plan.

Turret Top Temperatures Lower Sun Tests Show

Tests conducted by Fisher Body at Key West, Fla., with turret top bodies standing in the sun, are reported to show that temperatures of the interior and of the top materials increase more slowly than with other constructions. The difference is said to be due to the greater reflectivity of the polished top, to the conductivity of the metal which results in faster heat distribution, and to the insulating material and the dead air space between it and the headlining.

Foreman Training Manual Issued by Westinghouse

The Westinghouse Electric and Manufacturing Co. has just issued a manual, "Foremanship Development," which is a simplified plan for the training of foremen and other supervisors. The manual is based upon the experiences of the Westinghouse organization and other groups who have been active in supervisory training. According to the company the course is especially suited to industrial organizations not in a position to develop foremanship training courses of their own.

Ingersoll Steel & Disc Names Terrell Engineer

Ralph A. Terrell has joined the Ingersoll Steel & Disc Co., a division of the Borg-Warner Corp. at the West Pullman Plant as chief engineer. He succeeds S. S. Battles who resigned to become president of the Midwest Stamping & Enameling Co., Morrison, Illinois.

Mr. Terrell was formerly superintendent and chief engineer of the South Bend Tool & Die Co., South Bend, and previous to that efficiency engineer for the Frigidaire Corp.

Cadillac Training Course for Mechanics Organized

The Cadillac Motor Car Co. has inaugurated a training course for Cadillac mechanics throughout the country. A series of monthly examinations will be given all workmen enrolling for the course and upon completion of six months satisfactory work each mechanic will receive a gold pin bearing the words "Certified Craftsman." At the end of the year if the mechanic's examinations are still of a satisfactory nature a certificate of merit will be awarded. The company reports that more than 2000 service men already have enrolled.

Packard Has 236 Workers With 25 Years of Service

Including Alvan Macauley, president, records of the Packard Motor Car Co. show a total of 236 employees who have been with the company continuously for 25 years or more; 528 with 20 or more years of continuous service and of the company's total employment list 44 per cent have been employed continuously for five years or more.

Mr. Macauley, who recently celebrated his silver anniversary with Packard, presented 29 other employees with gold pins emblematic of a quarter century of continuous service.

Ledwinka of Budd Gets Patent No. 2,000,000

Joseph V. Ledwinka, chief engineer of the Edw. G. Budd Manufacturing Co., has been awarded United States Patent 2,000,000. Mr. Ledwinka went to Washington early this week and personally received the patent from Conway P. Coe, Commissioner of Patents.

Mr. Ledwinka's development is described as an "improvement for pneumatic tires for railroad cars" and has been assigned to the Budd company. Receiving patent numbers is no new experience for Mr. Ledwinka, for he has been acquiring them since some time before the issuance of the millionth number.

Arthur Stanley Zell

Arthur Stanley Zell, 58 years of age, head of the Zell Motor Car Co., Packard distributors, and who also formed another company recently to distribute the Hudson and Terraplane, died at his home near Baltimore last week. He is survived by his widow, a son, a brother and three sisters.

At one time Mr. Zell held records as a racing driver.

Automotive Chemical Code Budget Approval Sought

The automotive chemical specialties manufacturing industry code authority has asked NIRB for approval of a $10,000 budget to cover administration expenses from Oct. 7, 1934, to Oct. 6, 1935. Industry members would contribute at the rate of 1/20 of 1 per cent of the net sales volume of 1934 in a lump sum. Objections or suggestions may be submitted to Deputy Administrator E. W. Daglberg in Washington before May 16.

Dominion Co. to Sell Crossley Co. Engines

An association has been formed between the Dominion Engineering Works, Ltd., Montreal; Crossley Brothers, Ltd., Manchester, and Crossley Premier Engines, Ltd. of Sandiacre, England, as a result of which the Canadian company will manufacture and sell Dominion Crossley and Dominion Crossley Premier Diesel and gas engines in Canada and Newfoundland.

Lowest Price Classes Account for 96.79% of 1st Quarter Car Output

Passenger Car Production by Wholesale Price Classes

(U. S. and Canada)
First Quarter 1935 and 1934 Compared

	1935	1934	Per cent change	Per cent of Total 1935	Per cent of Total 1934
$500 and under	557,656	415,736	+ 34.0	61.31	68.93
$501-$750	322,688	151,114	+114.0	35.48	25.06
$751-$1,000	17,588	23,336	— 24.5	1.93	3.87
$1,001-$1,500	6,886	7,177	— 4.0	.76	1.19
$1,501-$2,000	2,303	3,034	— 24.0	.25	.50
$2,001-$3,000	1,505	1,989	— 24.6	.17	.33
$3,001 and over	869	735	+ 18.1	.10	.12
Total	909,495	603,121	+ 50.8	100.00	100.00

Truck Production by Capacities

(U. S. and Canada)
First Quarter 1935 and 1934 Compared

	1935	1934	Per cent change	Per cent of Total 1935	Per cent of Total 1934
1½ tons and less	194,014	140,447	+ 38.1	94.95	93.08
2 to 3 tons	8,022	8,770	— 8.5	3.93	5.81
3½ tons and over	1,615	1,279	+ 26.2	.79	.85
Special and buses	689	394	+ 75.0	.33	.26
Total	204,340	150,890	+ 35.2	100.00	100.00

Chevrolet Iron Foundry Pours 2306 Tons in Day

With 12 cupolas in operation, the gray iron foundry of Chevrolet Motor Company set a new record for a single day's pouring on April 19 with a total of 2,306 tons against the previous high of 2,152 tons established a year ago. On four successive days, an average of 2,103 tons a day was poured. Total for the five-day week was 10,279 tons. The foundry makes castings for Chevrolet passenger cars and trucks, including cylinder blocks, pistons, and clutch and transmission housings.

Motor Exports Continue Upward Trend, Bauer Says

Due to the Administration's reciprocal trade policy automotive exports thus far in 1935 have shown an increase of about 25 per cent over 1934, George F. Bauer, AMA export manager, told members of the League of Nations Association at a recent meeting in New York. Mr. Bauer said that since the consummation of the various reciprocal agreements export business went from a low of 182,000 cars in 1932 to 435,000 units in 1934.

Battery Makers Spring Convention Postponed

The Spring Convention of the National Battery Manufacturers' Association, Inc., originally scheduled for May 22 and 23 at the Hollenden Hotel, Cleveland, Ohio, has been postponed, in view of continued changes in legislation, legal decisions and N.R.A. policies.

CALENDAR OF COMING EVENTS

SHOWS

Machine Tool Show—Cleveland..Sept. 11-21
New York Automobile Show, New York, Nov. 2-9
Buffalo Automobile Show.....Nov. 9-16
Automotive Service Industries Show—Atlantic City .....Dec. 9-13

CONVENTIONS AND MEETINGS

American Society of Mechanical Engineers (National Oil and Gas Power Meeting), Tulsa, Okla..May 8-11
Automotive Trade Assoc. Managers Mid-Year Meeting, Washington, D. C. .....May 22-24
Automotive Engine Rebuilders Assoc. —Indianapolis .....May 27-30
S.A.E. Summer Meeting—White Sulphur Springs, Va. .....June 16-20
American Society for Testing Metals, Detroit .....June 24-28
National Assoc. Sales Finance Cos.—White Sulphur Springs.....Sept. 26-28
American Society for Metals, Annual Meeting—Chicago .....Sept. 30-Oct. 4
National Safety Council, Louisville, Ky. .....October 14-18
American Gas Association — Atlantic City .....Oct. 14-18
American Petroleum Institute — Los Angeles .....Nov. 11-14
National Industrial Traffic League—Chicago .....Nov. 20-21

RACES

Race—Indianapolis Race, Indianapolis, May 30

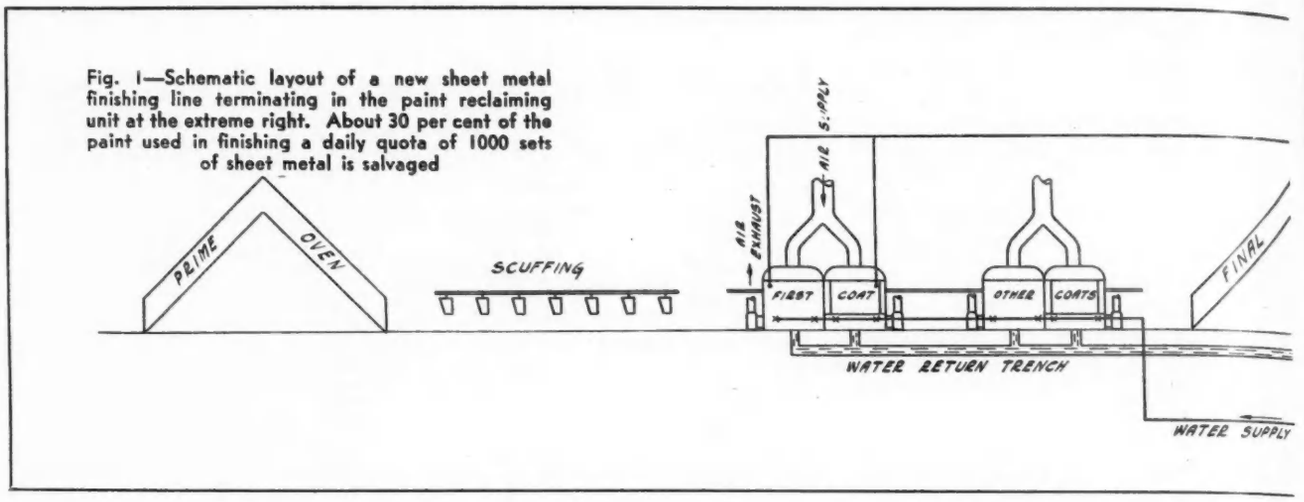


Fig. 1—Schematic layout of a new sheet metal finishing line terminating in the paint reclaiming unit at the extreme right. About 30 per cent of the paint used in finishing a daily quota of 1000 sets of sheet metal is salvaged

New Reclaiming Plant Salvages

Savings are an outgrowth of move to improve working conditions and safety—Downdraft spray booths furnished with conditioned air

by Joseph Geschelin
Detroit Technical Editor, Automotive Industries

SKILLFULLY combining scientific knowledge with mechanical ingenuity, Plymouth has developed a unified spray painting department terminating in a paint reclamation unit which, even in its experimental stages, salvages at least 30 per cent of the paint.

It all started with the determination on the part of the management that 1935 production would set a new mark for safety, operators' comfort, and freedom from fire hazard in the sheet metal finishing department. With this end in view, the Plant Engineering Division conducted numerous tests on various types of booths then being offered to the automobile industry by the leading spray booth manufacturers. These tests resulted in the design of a down draft water type spray booth to which the R. C. Mahon Company's hydro-filter arrangement was added, the net result being a booth of comparatively low power consumption characteristics as well as satisfactory fume elimination. Suffice it to say, for the moment, that in this department finishing 1000 sets of sheet metal a day, the spray booth operators work in comfort without the aid of masks or other protective devices.

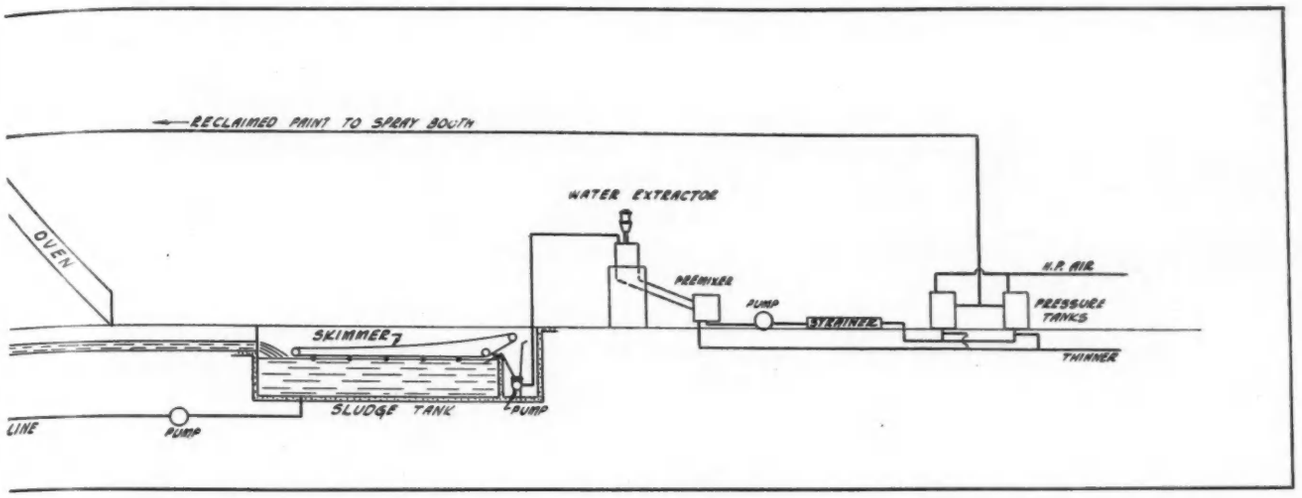
Here then is a mass production paint department where men can work in sanitary surroundings with the same comfort and ease as in any other part of the plant.

But the development didn't stop at this point. The plant engineering department then directed its attention to the matter of recirculating the large volume of water used in the operation of the battery of 23 spray booths. Since the water system was carrying off the overspray, usually dumped in the sewer and much of it ordinarily caking up the floor and sides of booths, it occurred to them that something could be done to extract the paint solids and perhap salvage the residue for some useful purpose.

Then followed a remarkable accomplishment. The plant engineer asked for authority to build and operate an experimental paint reclaiming unit with the hope that if it proved suc-

Supplementary Engineering Data

21—Booths at 8,000 CFM
2—Booths at 10,000 CFM
3—Fresh Air Supply Pent Houses @ 80,000 CFM
2500—Gals. per min. of water recirculated
16—Water spray nozzles per booth
50—Gals. paint scum collected per hour



System at Plymouth 30 Per Cent of Paint

cessful he might justify the outlay for a modern, mechanized plant. Results from the experimental unit exceeded all expectations. With home-made equipment and a couple of men it began to return a profit. The overspray, which careful tests have shown to represent about 30 per cent of the paint used in an automotive sheet metal department, was being salvaged at negligable cost.

The salvaged material consisting of paint solids and pigment is dehydrated, mixed with thinner, and then used for sealing crankcases and spraying the underside of sheet metal parts. The salvaged material is not colored but it used as recovered—a dull gray, the result of mixing the gamut of pigmented paints used in regular production.

As a result of this experience, the management approved an appropriation for equipping the reclamation paint unit which is described later.

Coming first to a study of the spray booth equipment, let it be said that this installation of 23 Mahon hydro-filter booths is unique in many respects. As shown in cross-section in Fig. 3 the spray booth employs the downdraft principle of elimination, receiving 40 per cent of its air from the top of the booth and the remaining 60 per cent from the room through the front and end openings. This arrangement carries the fumes down and away from the face of the operator and permits a more balanced air condition by receiving the air supply from four points rather than three as in the conventional updraft booth. This design provides for a positive elimination of fumes while handling a minimum volume of air, a booth ten feet long and eight feet deep using 8000 cubic feet per minute.

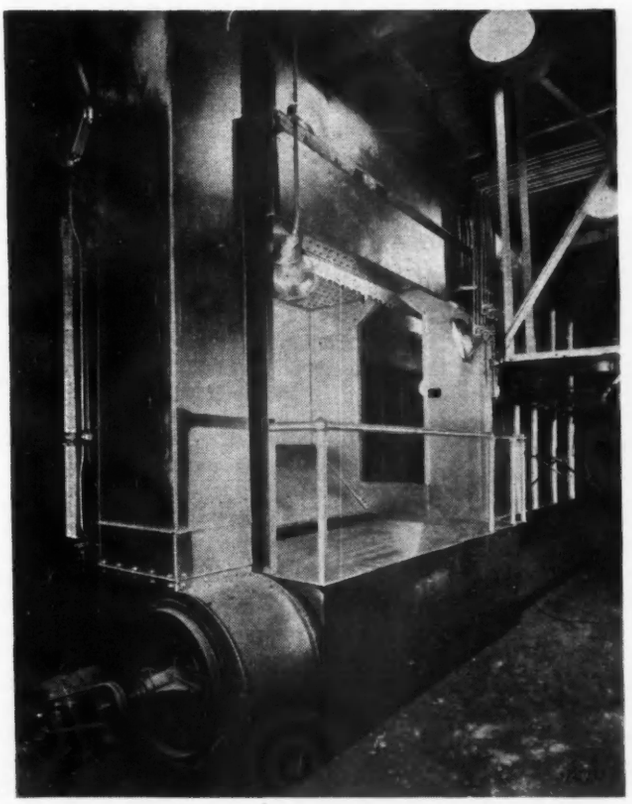


Fig. 2—View of spray booth showing chain conveyor line through the booth

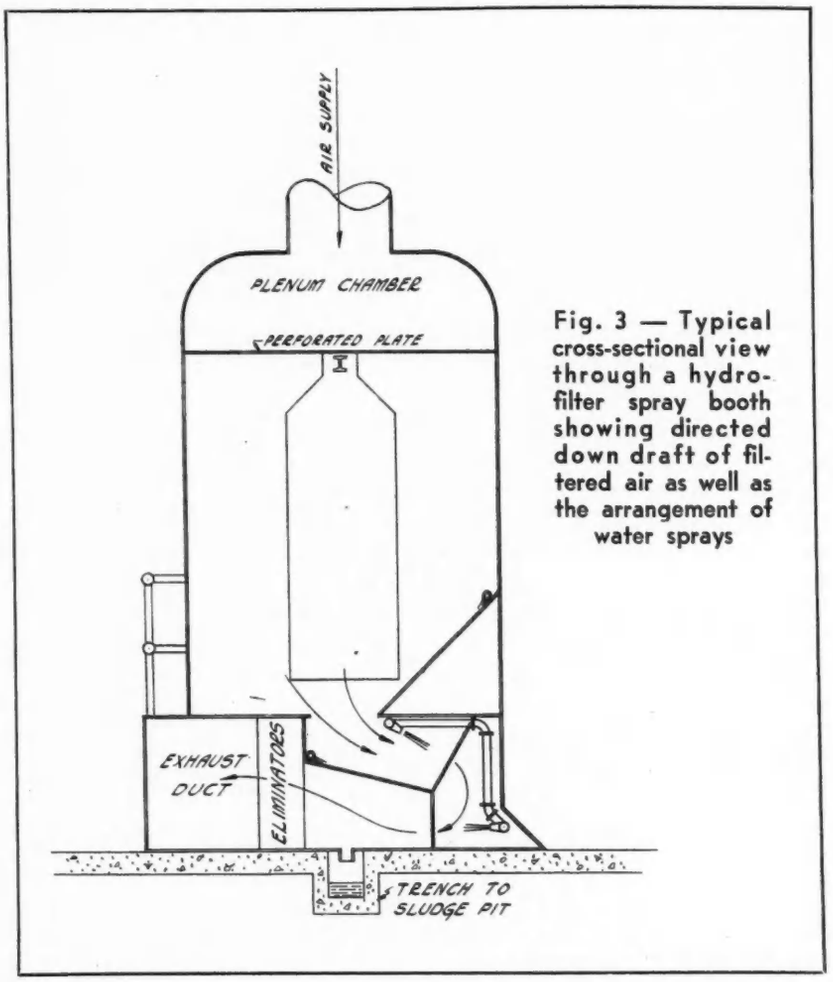


Fig. 3 — Typical cross-sectional view through a hydro-filter spray booth showing directed down draft of filtered air as well as the arrangement of water sprays

This item is of major importance in large installations where the installation cost of ventilating equipment to filter and heat the air supplied to the booths runs into a considerable figure. It is likewise apparent that the heating bill for a year's operation in Detroit of a unit requiring 250,000 C. F. M. makes any reduction in volume of air handled for proper elimination of fumes a point of considerable significance.

As shown in Fig. 3, the vapors are pulled down through an opening in the floor of the booth through batteries of sprays where the pigment is knocked out. To keep the back of the booth clean, a sheet of water is floated over the back panel. By experimenting with various arrangements of nozzles at the back panel, it has been possible to establish a water sheet which keeps the drip panel absolutely clean under all conditions.

Another point of interest lies in the fact that the entire heating load for the spray room fresh air supply is carried by "vento" hot water heating system heated with exhaust steam from the Forge Plant. Previous to this installation, a large portion of this exhaust steam was discharged to the atmosphere as waste.

For a schematic view of the whole layout including the reclamation unit, let us examine the cycle of events in Fig. 1. Parts coming from the oxide prime oven are delivered first to the scuffing room where they are prepared for painting and then transferred to the conveyors which lead from the scuffing room to the spray room. Thus all sanding and scuffing is kept remote from the painting operation.

The spray room is under pressure which prevents the infiltration of dirty air from either the scuffing room or the plant. The scuffing room in turn is cleared of fumes and dust by an exhaust fan directly overhead. To achieve these results, three pent houses have been built on the roof each one of which supports over 50,000 lb. of heating and ventilating equipment. The three units, combined, supply the spray room with 250,000 cu. ft. of heated and filtered air per minute. This capacity provides a total air change in the room once every minute and a complete air change in each booth once every four seconds.

The method employed to salvage the paint pigments and solids is remarkably simple and inexpensive. In the first place, the water circulating through the spray booth having collected the solids in the overspray is discharged by gravity down the water return trench to the skimming tank. This tank serves as a reservoir for all the liquor from the 23 spray booths and is large enough to permit the solids to float to the top while the water is recirculated to the booths.

An automatic skimmer, quite like a flight conveyor, removes the scum from the top of the tank and discharges it into a hopper placed directly over a double acting piston pump. This pump forces the material, now in the form of a highly aerated mud, to the centrifugal extractor where the water is removed. The dry residue is automatically discharged from the bottom of the extractor into a premixing tank where thinner is added and mixed with the paint solids.

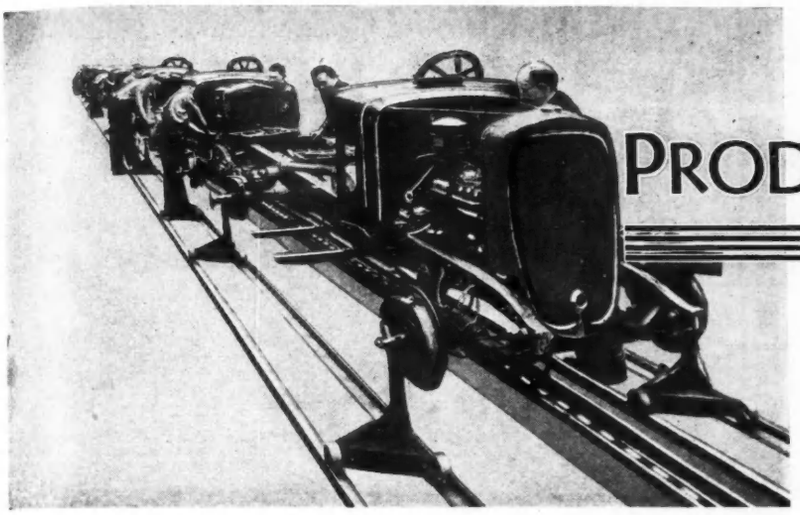
The paint which is now in a liquid form is passed through a series of strainers to the pressure tanks where the viscosity is checked and additional thinner added if necessary. The color of the reclaimed paint is usually a dull gray. No attempt is made to change this back to its orignal color and thus reuse it on the same parts to which it was originally applied. Rather its use is found in numerous production applications where color is of secondary importance, the entire quantity being used in the Plymouth Plant.

Various tests have demonstrated the life and durability of the salvaged paint to be comparable with that originally purchased.

Publications Received

THE Chemistry and Refining of Petroleum, by H. P. Rue and H. M. Smith. A Chapter from the Minerals Year Book, 1934.—Government Printing Office, Washington, D. C. (5 cents.)

Nebraska Tractor Tests, 1920-1934. Bulletin No. 292 of the University of Nebraska, Lincoln, Neb. This bulletin contains the General Procedure and Rules for Official Tractor Tests, the Nebraska Tractor Law, the A.S.A.E. and S.A.E. Rating Code, and abstracts of reports of tractor tests made since 1920, together with a large table giving a summary of the results of the tests. Only test results of tractors still in production are included.



PRODUCTION LINES

Use Color

Borg & Beck, one of the most prolific producers of clutches in this industry, has a very interesting device for keeping track of small springs. Naturally, a lot of springs are used in this plant, varying not only in size but in characteristics. Since it would be embarrassing, to say the least, to assemble a clutch with anything but the right springs, all springs, after inspection, are sorted according to weight and then dipped in lacquer of some characteristic color. The color stays with the spring during its entire life cycle.

Zinc Dust

Industrial paint users are finding many uses for zinc dust in paints and primers. It is said to be an excellent rust-inhibitor and therefore very useful in primers for black iron. Paint treated with zinc powder seems to serve exceedingly well on iron, steel, and galvanized surfaces. But—read the whole story in a booklet issued recently by the New Jersey Zinc Co. It's called "Metallic Zinc Powder in Industrial Paint." And it's free to readers of this page.

New Service

It's pretty hard for men to get around the various plants to see what they would like to see. Even next door neighbors don't do much visiting, what with the extraordinary rush of business these days. That's where we come in. From now on we intend to spend a lot of time around automotive parts plants. What we see we'll pass on to you. We can assure you that your suppliers have developed mechanical methods well worth noting.

Quill Bearings

A recent estimate made by Bantam indicates that the automotive industry will use at least a billion quill bearing rollers this year. We can see how this is possible after a brief demonstration of how Bantam makes them. One of the most promising applications, in the not too distant future, is the use of quill bearing rollers for connecting rod bearings. The rollers will permit compactness with all the undoubted advantages of anti-friction bearings.

Pioneering

Brightest spot of our recent visit through the Middle West was Art Herrington's plant in Indianapolis. We had the rare privilege of seeing the doings in the experimental and engineering departments. Marmon-Herrington is really pioneering some outstanding developments. In fact, we marvel at their ability to do what they are doing with a relatively small band of active workers.

Diesel Power

Look for another "made in America" diesel fuel injection system. A very prominent parts maker is behind this one and it may be ready before the end of the year.

Really Automatic

We are promised a ride very soon in a car equipped with an automatic clutch and transmission hook-up. It is a mechanical drive, shifting automatically, with a foot button arrangement for shifting into lower gear at any vehicle speed. You'll have a report when we have driven the car.

Fuel Economy

Out on the Coast there is project under way to study heavy-duty transport service from the point of view of engine performance and economy. One result may be some light on the relative economy of diesel and gasoline operations when the gasoline jobs have been scientifically worked out to produce their best performance.

Gold

Met a factory executive the other day who has struck gold. Yes, he has an interest in a gold mine. He carries a little sample bar worth $60, just as a sort of charm.

Newcomer

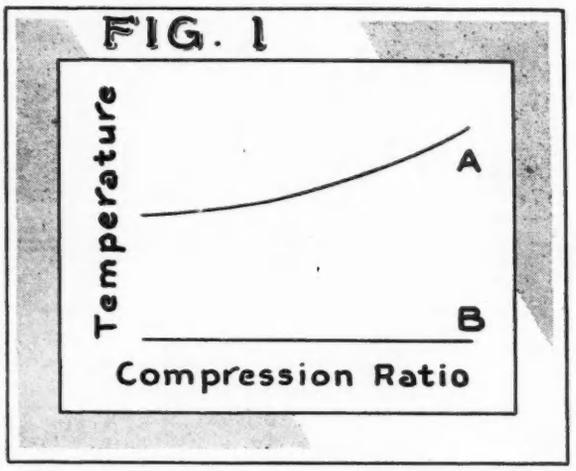
Plaskon Parade is a new house organ devoted to the latest offerings of Toledo Synthetic Products, makers of molded color. Don't miss this one. If you are at all interested in urea plastics, this booklet will keep you posted. We'll get you on the regular mailing list.

Small Sleeves

One of our friends tells us that a prominent outboard engine maker has developed a job with nitrided cylinder liners. This may solve the problem of corrosion and wear, provided the piston rings can take it.

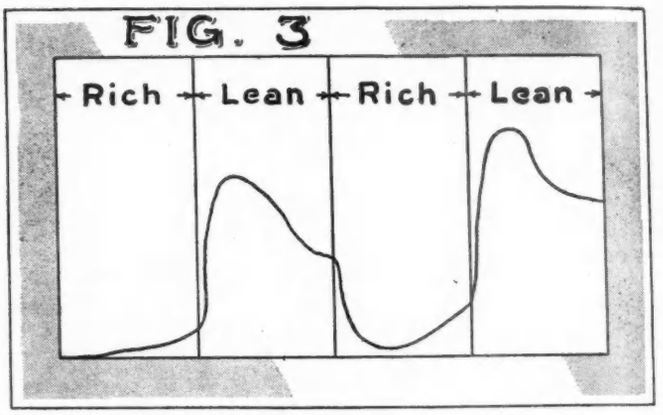
—J. G.

MANUFACTURING MANAGEMENT METALLURGY



Procedure fo Resistance to

by Earl A. Keeler*



AS long as all spark plugs were of the truncated cone-tip type, the engine conditions necessary to bring about preignition served as a basis for rating the plugs, but these ratings defined the upper limit of performance only. The ranges of such plugs were substantially equal, in that a "cold" plug had a high fouling tendency as compared with a "hot" plug. At present, however, types of spark plugs are available which retain to a considerable extent the advantages of "cold" plugs without sacrificing the desirable resistance to fouling which formerly was characteristic of "hot" plugs alone.

The need for the increase in range of spark plugs is illustrated by Fig. 1. Curve *A* represents the effect of the compression ratio on the tip temperature under conditions of full load and maximum speed, while line *B* shows the effect of the compression ratio on the tip temperature under idling conditions. The increase in the temperature difference between full-load and idling conditions with increase in compression ratio shows the need for plugs of wider range in the high-compression engines of today.

With the idea of developing a "yardstick" for spark-plug performance, a study of suitable methods for determining the upper and lower limits was started. Since both preignition and fouling result in a decrease in power, power output was considered the essential criterion of the engine conditions under which both limits should be determined. Thus the three objectives noted below were established:

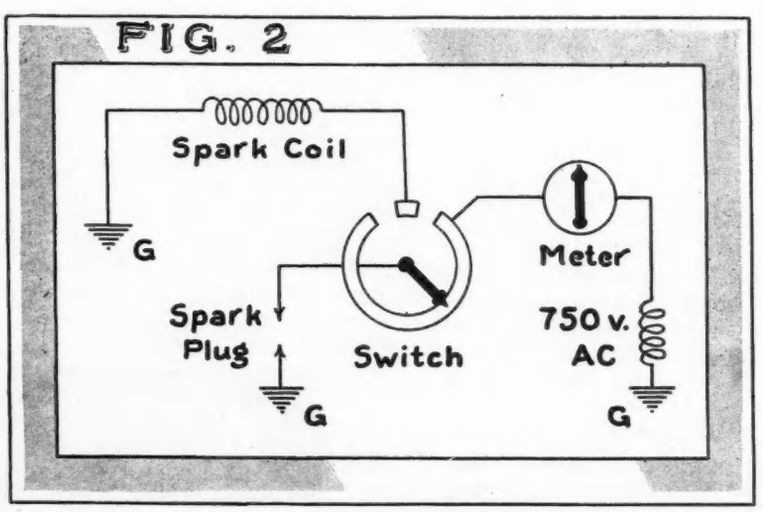
1. Determination of the upper limits, based upon effects of preignition.

2. Determination of the lower limit, based upon effects of fouling.

3. Selection of suitable rating factors so that the upper and lower limits will provide an easily interpreted measure of performance range.

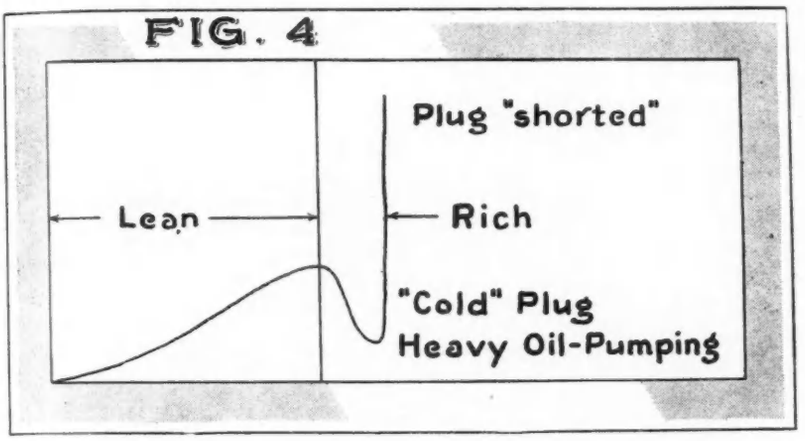
The upper limit, determined by preignition, is well understood and is largely dependent on engine characteristics. The use of "power decrease" as a criterion of performance limit takes account not only of the direct thermal effects on the insulator, shell skirt, and electrodes, but also of the effect of heat in lowering the electrical resistance of the insulator tip due to poor material or encrustation of its surface. The standard C.F.R. engine—on which these tests were made at the laboratory of the Waukesha Motor Co.—while excellent for comparing "hot" plugs, was found to be too low in R.P.M. and B.M.E.P. to permit of a satisfactory comparison of the "colder" plug types.

The lower limit of spark-plug performance, as evidenced by a decrease in power due to fouling, is not so well



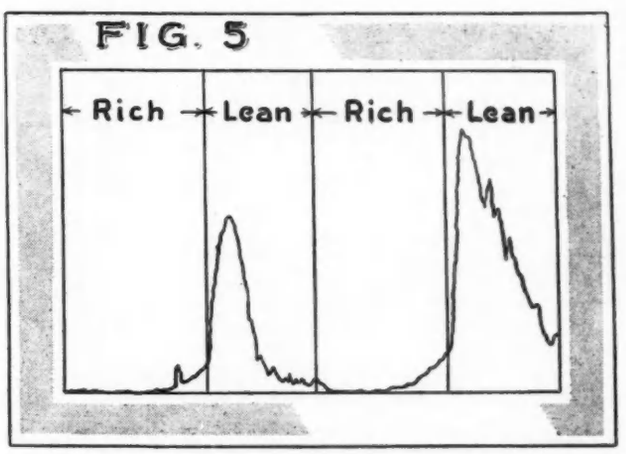
* Formerly research and chief engineer of Defiance Spark Plugs, Inc., and research engineer of the Globe Union Mfg. Co.

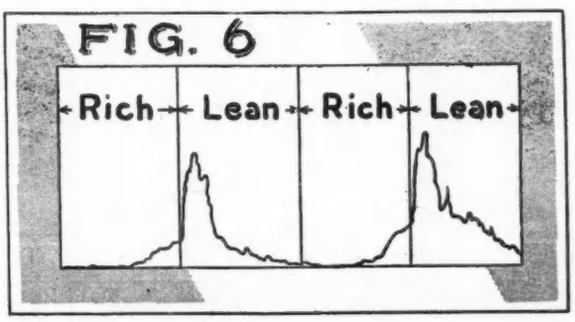
for Rating Spark Plugs for to Fouling Sought in Tests

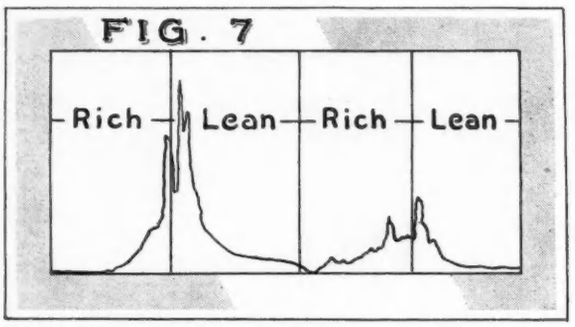


understood, and is a subject on which little published information is available. In undertaking a study of this subject, the first problem that arose concerned the method of measuring the "fouling" through various "fouling-and-burning" cycles without removing the plug from the test engine. Fig. 2 is a diagram of a circuit that was found fairly satisfactory for the purpose. It will be noted that a special switch, synchronized with the breaker points, connects the spark plug during its non-sparking periods to the secondary of a 750-volt alternating-current transformer, a sensitive milliammeter being included in the circuit. Carbon deposits on the insulator of the spark plug permit a current to flow which is roughly proportional to the amount of carbon deposited and its ability to produce ignition leakage. A higher measuring voltage would be preferable but cannot be used because of the danger of causing preignition.

The next problem concerned the "fouling and burning" cycle most representative of average conditions. As a result of some experimentation, a 20-minute cycle was adopted, made up of two "lean" periods of 5 minutes each and two "rich" periods, also of 5 minutes each. Further study showed that it made little difference whether these periods consisted of idling and full-load operation respectively, or whether speed and throttle opening were constant throughout. Consequently, the standard C.F.R. engine was run at its regular speed of 900 r.p.m. and under full throttle during all cycles. Fig. 3 is a record of such a test made with a conventional "cool" metric plug and a gasoline of 61 octane rating, the curve being plotted from the readings of the meter shown in Fig. 2. The graph indicates an increase in the carbon deposit during the first "rich" period. During the following "lean" period the conductivity at first increases, due to the increase in combustion-chamber temperature, but later it decreases as the carbon deposit is actually being burned away. The meter indication shows that the carbon was not completely burned away at the end of the cycle. At the start of the second "rich" period there is a further decrease in conductivity of the carbon deposit, due to the lowering of the tem-

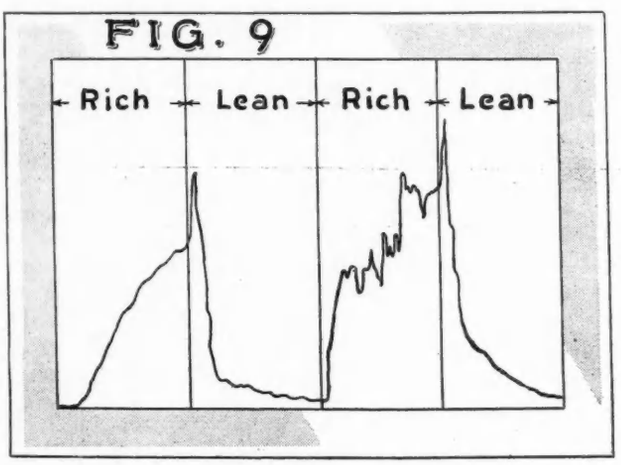






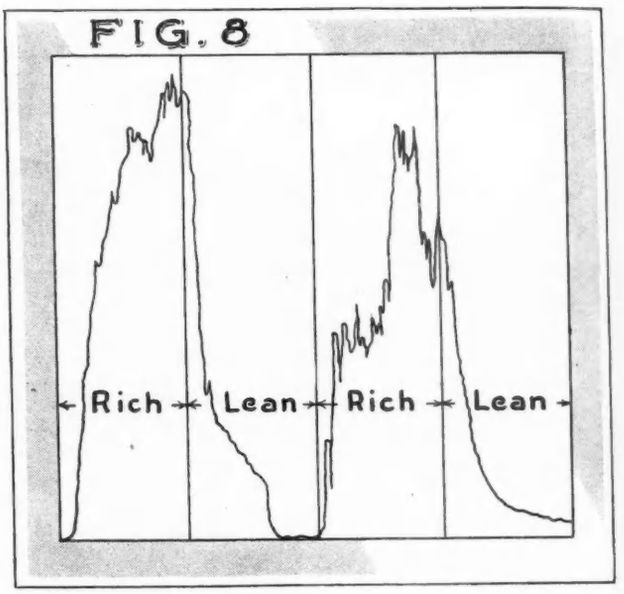
perature in the combustion chamber. This is followed by the second rich period, and the second complete cycle is essentially a repetition of the first one, but there is a noticeable increase in the carbon deposit and some consequent misfiring at the peak of the second "lean" period. This graph seems to represent fairly accurately the gas-fouling cycles in an automobile engine that is alternately idled and "opened up" in actual service.

The "lean" mixture of these tests is that which corresponds approximately to the maximum knock. The "rich" mixture was secured by opening the main needle valve of the Stromberg M-1 carburetor about ⅝ of a turn. This resulted in a gasoline consumption about 50



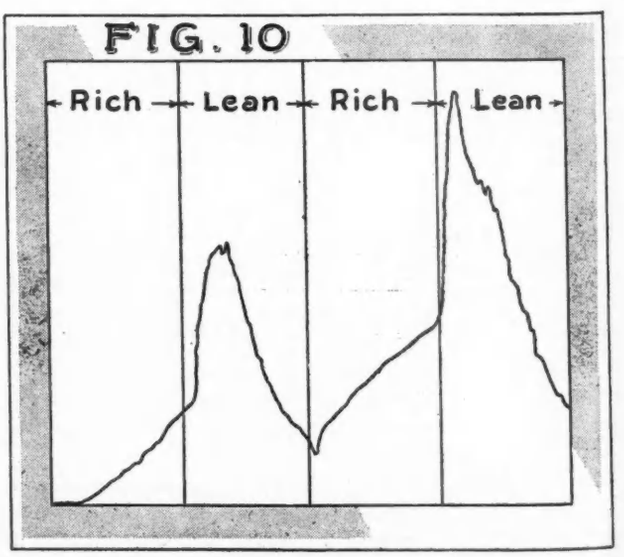
per cent in excess of that with the "lean" mixture.

Similar records obtained with various plugs did not conform to the heat-range designations of "hot" and "cold" plugs. This led to a decision to study the effects of fouling brought about by excess oil, to determine whether there would be similar discrepancies with service experience in that case. Additions of lubricating oil to the fuel in proportions up to 10 per cent were found to have comparatively little effect on the plugs, whether the carburetor was adjusted for "lean" or "rich" mixture. Further tests were then made in which fouling was brought about by "oil pumping" past the pistons. After some experimentation, an arrangement of piston rings and of a high oil level in the crankcase was contrived which resulted in fairly constant "oil-pumping" conditions. Fig. 4 shows the effect on a conventional plug of the combination of oil pumping and a rich fuel mixture. It will be seen that while the plug ceased firing when used with a rich mixture, it showed far less effect when used with a lean mixture. Further tests produced similar results and led to the conclu-

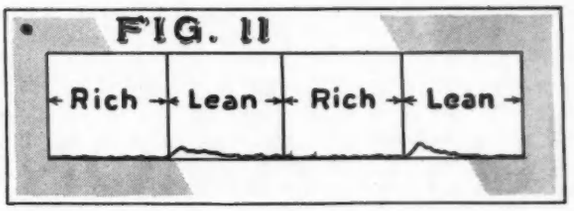


sion that oil fouling is most detrimental when accompanied by gas fouling. In this test the various plugs behaved more nearly in conformity with their heat range ratings than under conditions of gas fouling.

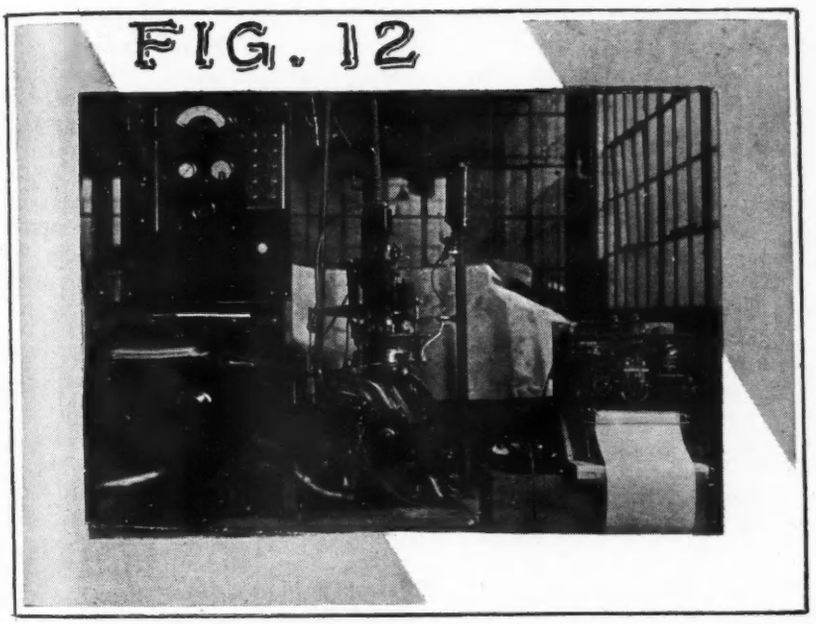
Many of the data obtained in the oil-and-gas fouling tests were difficult to correlate with experience with similar plugs in service. Rapid and extreme variations occurred at times, and as it was believed that a continuous record of fouling cycles would eliminate possible errors due to these fluctuations



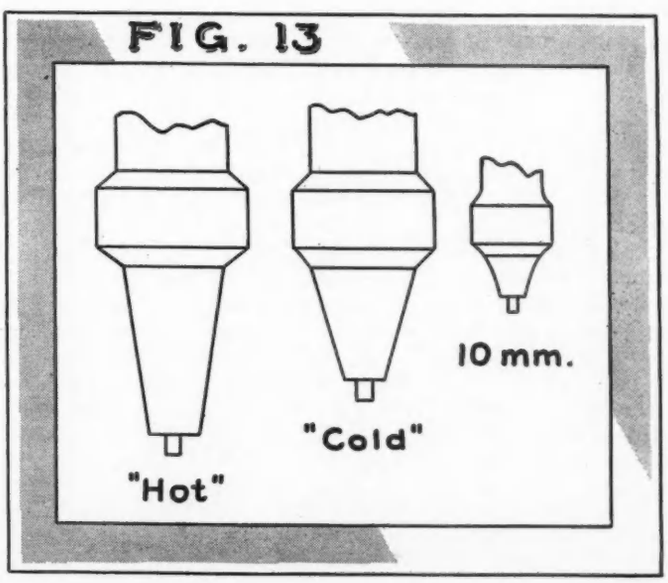
and the comparatively infrequent meter readings, a Leeds & Northrup recording system was modified to record the measuring current. Fouling-test records obtained with this equipment are shown in Figs. 5 to 11. The addition of the recording equipment, however, threw little light on the inability to accurately correlate the results obtained with those of service experience. Consequently, further effort was made in the combination of slight oil pumping with the usual "rich-lean" cycle to more closely approximate the conditions existing when there are difficulties in service. Figs. 5, 6 and 7 were obtained in this way and represent respectively, the performances of a "cool" plug, a "hot" plug and a 10-mm. plug used with an adapter. It will be noted that the "cool" plug shows greater fouling than the "hot" one. A point of interest in the graph for the 10-mm. plug is that it shows practically no carbon accumulation during the second cycle as compared with the first. The second cycle also shows a lower peak than the first. This difference as compared with the typical graphs of Figs. 3, 5 and 6 was checked several times, every time with similar results. Fig. 13 is a comparison of the sizes of the firing tips of the plugs used in the tests of Figs. 5, 6 and 7. It would seem that the different behavior of the 10-mm. plug was due principally to its low heat capacity and rapid thermal response. Rather promising results have been obtained with insulators having similarly small tips, in 18-mm. and ⅞-in. shells. This points to the possibility of standardization of insulators with small tips in all spark plugs regardless of shell size.



Some interesting results were obtained when using different fuels Fig 8 was obtained when using a special fuel of aromatic type. An essential difference between this and the typical curve of Fig. 3 is that the peak of the carbon conductivity curve occurs at the point of transition from "lean" to "rich" mixture, rather than later during the lean period. Fig. 9 was obtained when operating on kerosene with the same carburetor and the same compression ratio but with a manifold temperature of 250 deg. F. It will be observed that this graph resembles Fig. 8 more than Fig. 3, as regards peak location. This, apparently, was due to a tendency to "diesel," since Fig. 10 shows considerable change with a decrease in compression ratio made to eliminate self-ignition.



A most interesting effect was noted when ethyl gasoline was used in a fouling test of a fairly "cold" plug. The results, plotted in Fig. 11, show that there was very little fouling as compared with Fig. 3, in which results from the same plug when using 61 octane gasoline are plotted. To make certain that dissimilarity of base fuels was not the cause of the observed difference, the test was repeated on a straight gasoline to which sufficient ethyl fluid had been added to bring the lead content to the same value as in the regular ethyl gasoline of 77 octane rating. These observations raise the question—worthy of further investigation—whether the apparent freedom from fouling does not prove spark plugs to have a greater range of performance when operating with ethyl fuel.



JUST AMONG OURSELVES

Federal Regulation on the "Must" List

THE President went to bat again for Federal regulation of interstate motor carriers in his Sunday evening broadcast. However, the fact that this legislation is definitely on the administration's must list doesn't mean necessarily that, if Congress does pass a bill at this session, it will be the modified Eastman proposal which the Senate approved with so little ceremony some weeks ago.

On the contrary, there is considerable confidence that the Eastman measure will be drastically revised by the House and in conference to meet the objections which have been voiced in economically and politically powerful quarters. As a result, it is regarded as probable that when and if a bill becomes law, it will provide for less detailed and rigorous control of trucks than the Eastman proposal, particularly in the matter of rate regulation.

* * *

The Toledo Strike

ANYONE who reads the demands made on the management of Chevrolet's Toledo plant and the company's answers, which are published elsewhere in this issue, can hardly fail to be impressed with the fact that the strike was not called because of unsatisfactory wages, hours or working conditions, nor because the company assumed an unyielding attitude. Five of the union's 29 demands were conceded and on almost all of the remainder the company indicated its willingness to negotiate a compromise, in a number of cases making definite counter-proposals. Where demands were rejected, except in one instance, reasons were given which in a number of cases were based on the President's settlement and the rules issued by the Automobile Labor Board under that agreement.

The closed shop is not mentioned in the union demands but there is scant reason to doubt that its establishment is the ultimate objective of the walkout. Moreover in view of the timing of the strike just before the final ALB elections, it seems clear that the immediate intent was to strike a blow at that administrative agency.

* * *

Facts for Dealers On a Grand Scale

THERE has long been a crying need for the sort of information about the financial aspects of the retail automobile business, which the National Automobile Dealers Association has announced it proposes to get. The data are to be compiled monthly and "will depict conditions of every nature to the trade in every city, every State, in regions and nationally." Moreover it will show all items of income and outgo "even to the postage stamps in every department. . . ."

As anyone who has had anything to do with surveys of this kind can appreciate, the NADA has mapped out a large job for itself and one that will cost plenty of money if it is carried out in the detail promised. The first obstacle to be surmounted is getting monthly operating statements from any substantial proportion of the nation's 35,000 dealers. The association says it expects no difficulty on this phase of the work "because it is the dealers' own demand," and, of course, if the reports don't come in as expected, dealers can hardly criticize their association for failing to meet their "demand" for factual information.

If the reports do come in volume, the statistical job of compiling the facts to "depict conditions of every nature to the trade in every city, every State, in regions and nationally . . . even to the postage stamps in every department" looks to us like a job for the Census Bureau.

Altogether it seems as though the projected NADA survey would have had a greater chance of success, if it had promised less—at least for the present.

* * *

Coercion from Any Source

"I THINK the bill ought to be amended so as to include intimidation or coercion from any source," Senator Wagner said at the hearings last year on his labor disputes measure. But the revised bill the Senator put before this session of Congress does not contain the amendment.

Why? The reason for its omission is said to be that proponents of the legislation are fearful of the interpretation the court's might put on such a prohibition. If this is the real reason and there is a real danger that the courts will misinterpret a bare prohibition of "coercion from any source" in a manner that will interfere with legitimate labor organization activities, is there any reason why this bill cannot be amended to explain what is meant by the language?

Senator Wagner has defined in considerable detail what constitutes coercion by employers so that the courts will have no doubts as to the intent. Why, if it is feared that the courts will distort the intent of a terse prohibition of coercion from any source, isn't it possible to amend the bill to provide guide posts for the courts in the interpretation of this prohibition exactly as had been done in the case of employer coercion?

The Editors

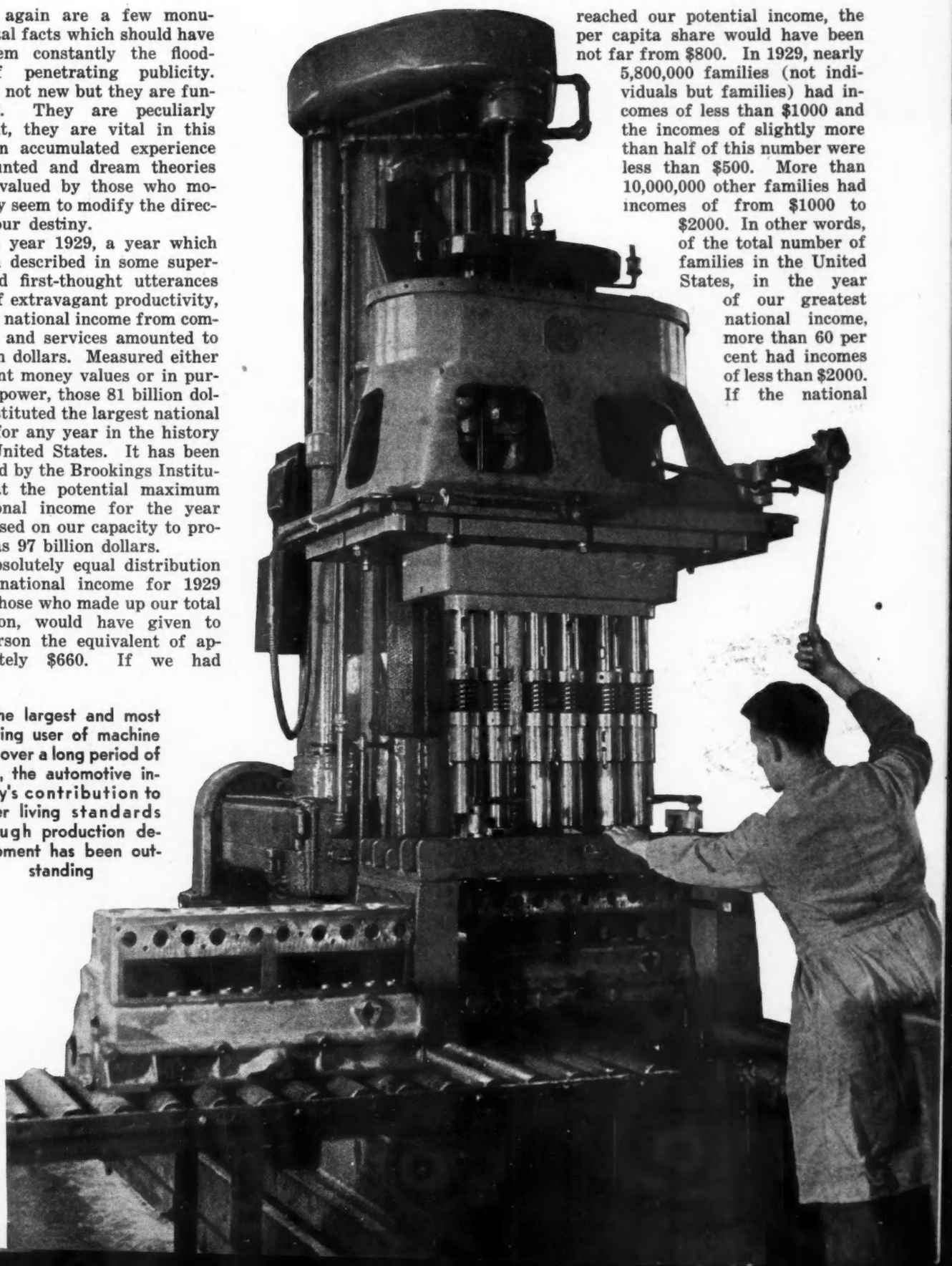
Men AND Machinery

By Julian Chase

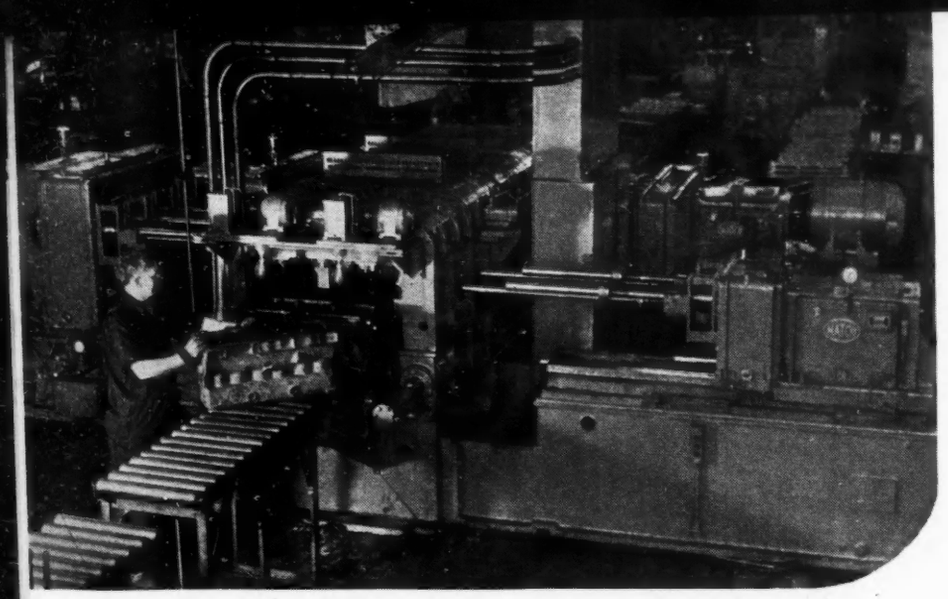
HERE again are a few monumental facts which should have upon them constantly the floodlight of penetrating publicity. They are not new but they are fundamental. They are peculiarly important, they are vital in this day when accumulated experience is discounted and dream theories are overvalued by those who momentarily seem to modify the direction of our destiny.

In the year 1929, a year which has been described in some superficial and first-thought utterances as one of extravagant productivity, our total national income from commodities and services amounted to 81 billion dollars. Measured either in current money values or in purchasing power, those 81 billion dollars constituted the largest national income for any year in the history of the United States. It has been estimated by the Brookings Institution that the potential maximum of national income for the year 1929, based on our capacity to produce, was 97 billion dollars.

An absolutely equal distribution of the national income for 1929 among those who made up our total population, would have given to each person the equivalent of approximately $660. If we had reached our potential income, the per capita share would have been not far from $800. In 1929, nearly 5,800,000 families (not individuals but families) had incomes of less than $1000 and the incomes of slightly more than half of this number were less than $500. More than 10,000,000 other families had incomes of from $1000 to $2000. In other words, of the total number of families in the United States, in the year of our greatest national income, more than 60 per cent had incomes of less than $2000. If the national



As the largest and most exacting user of machine tools over a long period of years, the automotive industry's contribution to higher living standards through production development has been outstanding



Automotive and related occupations give employment to 10 per cent of our gainful workers

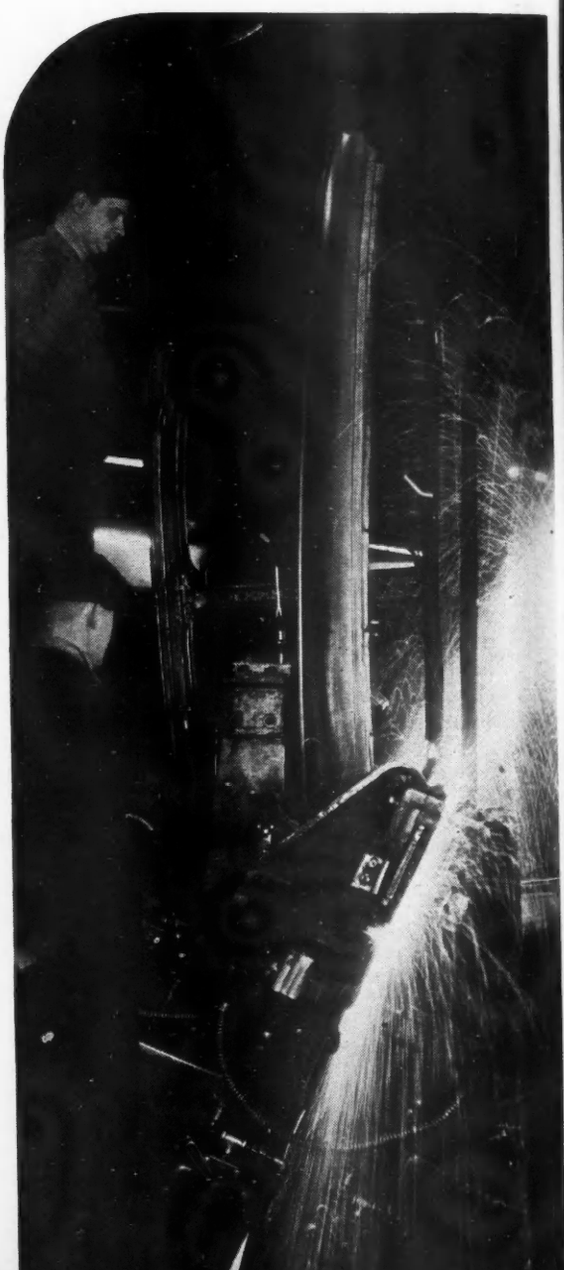
income had been distributed equally among all families, each family would have received: 81 billion dollars ÷ 30 million families = $2700.

Is this real prosperity? Does it meet the needs of a standard of living which will provide life's essentials plus enough in the way of comfort and luxury to be reasonably satisfactory in America of the 20th Century. We want more.

To increase our average family income we must increase our total national income faster than our population increases. We must increase our production of goods and services. There is no other way to do it if we consider real income or purchasing power, not dollar wages. Man's unaided capacity to produce was reached long years ago. We can now increase our per capita productivity only by the further and more efficient use of machinery. In no other manner can we provide larger incomes and allow more leisure. Despite the long range promises of science, there is, today, no other way to do it.

If we are to slip our necks into the strangling collar of collectivism, under any current form of which the social organism is inherently a machine made up of human parts—a complete mechanization of mankind—we still cannot increase the income of the individual or satisfy his growing needs and wants without increasing his productivity. To make larger shares, we must have more to divide.

Of course, if human desires and human habits change and we turn away from our present path with new conceptions of the aims and purposes of life and readjusted estimates of values, we may head toward a social order in which true contentment can be had with less rather than more dependence on the aid of mechanization. But today's problem is today's problem. Hopes that may be fulfilled only through slow evolutionary



development ring with a hollow mocking sound when given the sledge-hammer test for present practicality.

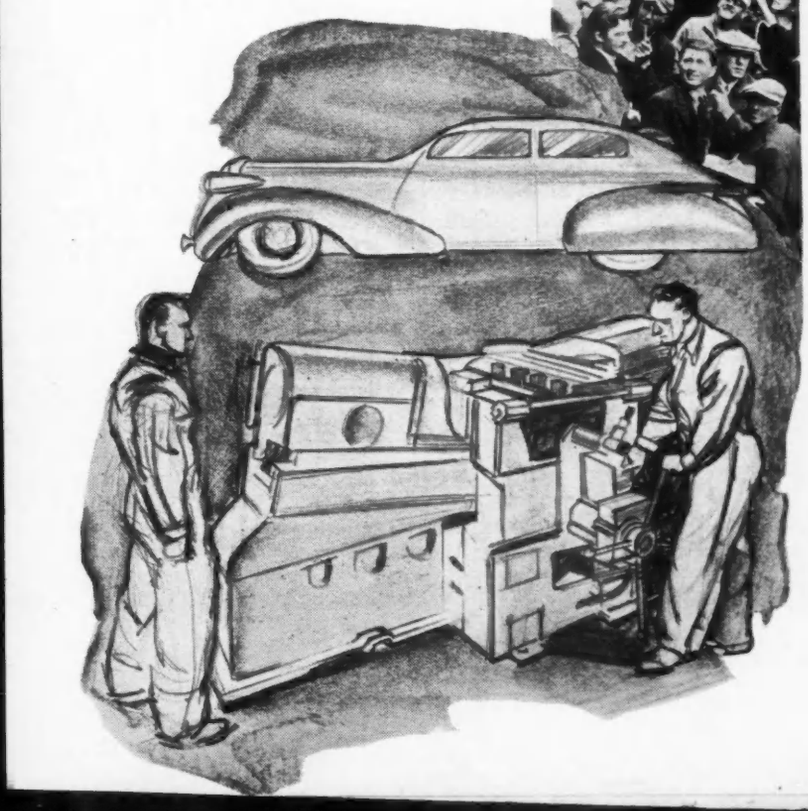
In considering contributions to the raising of living standards, let us look at the record of the much maligned machine age of Capitalism. To get a correct interpretation of it we must do our looking not as bifocaled Technocrats who glimpse only short sections of the record through their reading lenses. We must stand off at a distance and survey the record as a whole.

The record shows that from 1870 to 1930, manufacturing and other mechanical pursuits, mining, transportation and trade—all occupations most affected by mechanization—have paid an increasing wage, measured in purchasing power, to a constantly growing proportion of our population gainfully employed. In 1870, 34.9 per cent of our gainful workers were in this group. In 1930, the percentage was 61.2. Real wages measured by wholesale prices and based on the year 1926 as 100, increased from an index of 32 in 1849 to 106.3 in 1929.

During the same period the percentage of those engaged in agriculture decreased by one-half, and yet, until we reached the day of pig pogroms and plowing-in, this greatly reduced proportion of our population was easily able to meet our conspicuous needs and occasionally to choke our inadequate channels of distribution. Mechanization made this possible; better implements; better fertilizer, manufactured by improved processes and equipment, and made more readily and generally available by better mechanical transportation; better knowledge, spread by the more extensive use of the linotype, the printing press and telephone. In recent years, radio has helped — more machinery.

In the industries we find that, between 1849 and 1929, there was an increase of 365 per cent in the value added by manufacture per wage earner, applied against the yearly wholesale price index, with an increase of 90 per cent in the thirty years following 1899. The curves of dollar wages per dollar value added by manufacture and of wages per value of products manufactured, over the entire

New industries make new jobs. In fifteen years automotive manufacturing provided directly seven and a half million man-years of increasingly profitable labor for wage earners who were paid more than eleven billion dollars. Enate and contributory occupations added more than forty-eight million man-years and more than fifty-seven billion dollars in wages during the same period.



period (1849-1929), look almost as though they had been drawn with parallel ruling pens. This shows that the return to the wage earner in relation to the return to his employer has been maintained with the progress of increasing mechanization.

In the past 35 years, the automobile—a mechanical aid to man, which was made possible, in the present extent of its usefulness, only through the unprecedented development of mechanized manufacturing — has provided immeasurable benefits to mankind generally. Its blessings are multifarious. Its contributions to what we call civilization are countless and potently consequential.

Eliminating if you will, all motivating influences but the profit incentive and the spur of free competition—two disparaged attributes of the Capitalistic System—the automotive industry can still be given credit, perhaps more than is due to any other group in industry, for advancement of the general welfare. This comes about not only through its uniquely extensive use of machines and machinery and its reward to workers, but also through the ingenuity and courageous adventuring which it has contributed to the development of mechanical production and to the increase of per capita productivity.

There will be urgent need in the years now almost upon us for further progress along these lines. No group in industry will study the new offerings of the production machine makers with greater interest or more pressing concern than will the automotive manufacturers.

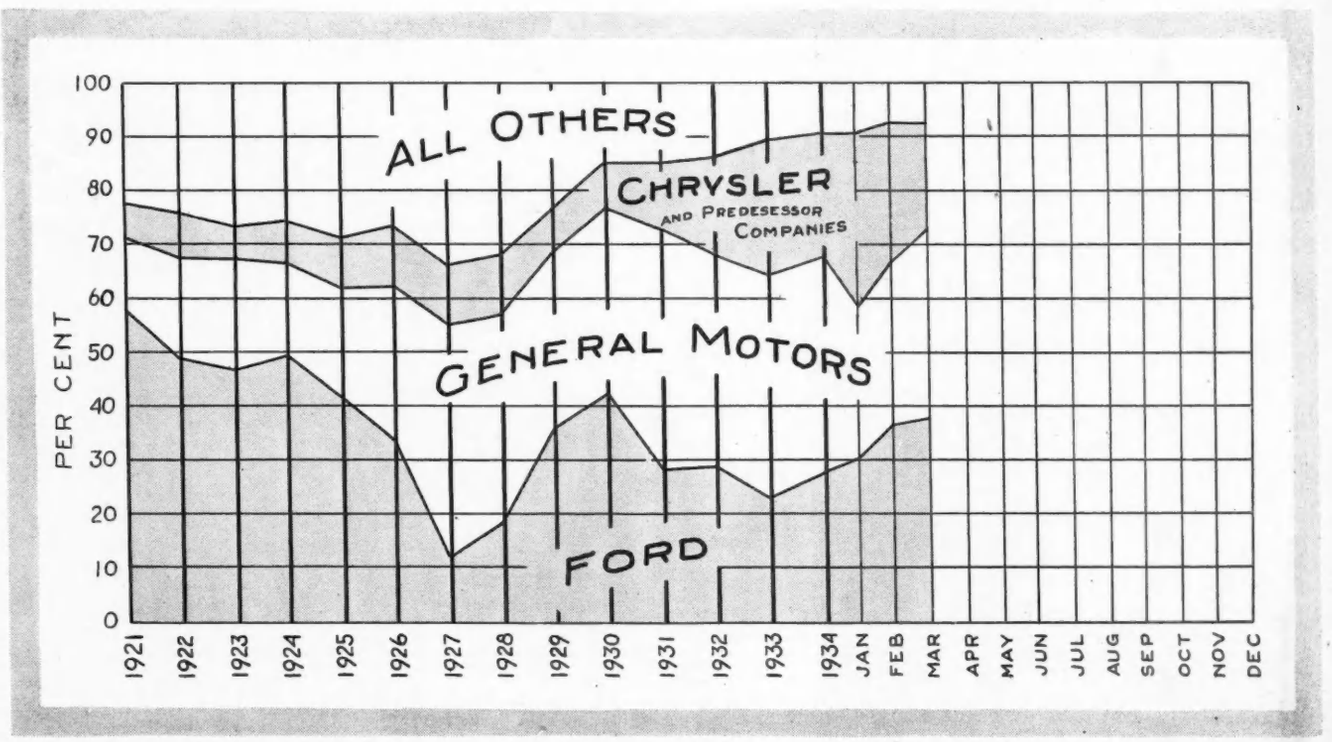
The 14-Year Record of Passenger Car Production

THE distribution of passenger car production among the major manufacturing groups is shown here for a period of more than 14 years. In 1921, nearly 57 per cent of the cars manufactured were Fords, with 13.4 per cent going to General Motors and 6.55 per cent to the companies which preceded the present Chrysler organization. Nineteen twenty-one was the high point in the period for Ford, its share trending steadily downward, with the exception of 1924, until 1927, when the Model A replaced the T. Production of the A climbed until it represented 42.3 per cent of the total in 1930. Ford started a new upward movement in 1934 which is continuing this year.

General Motors expanded its share continuously from 1921 to 1927, when its portion amounted to 43.7 per cent, with the exception of 1924. From 1927 on, GM's share varied up and down, reaching an all-time peak of 44 per cent in 1931.

The percentage of total going to Chrysler and its predecessor companies decreased steadily from 1921 to 1923. In 1924, the first Chrysler reversed the trend, and from that year until 1931 Chrysler's share moved up and down. Then Plymouth began its meteoric rise, which has been responsible to a large extent for lifting Chrysler to its present important position in the passenger car field.

The share of the business going to the independent companies increased rather steadily until 1927, the year of Ford's changeover. Thereafter these companies have obtained a steadily smaller share of the total, due in the main to the shift in public demand to the lowest-price field.—D. B.



Union Demands and Chevrolet's Answers

For the interest they may hold for automotive employers who are or may be faced with similar situations, Automotive Industries is presenting here the proposals made by the A. F. of L. union at the Chevrolet plant in Toledo and the company's answers. On receipt of these answers, union leaders called a strike without referring them to the workers.

Item 1

SECTION 1. The company agrees to meet with the duly accredited representatives of its employees upon all questions arising between the company and its employees, with a view of adjusting any grievances and complaints which may now exist or which may arise in the future.

ANSWER. This is conceded in accordance with present company practice of meeting with duly accredited representatives of all or any of its employees.

Item 2

SECTION 1. The right to have an Executive Shop Committee representing the employees is conceded, such executive shop committee to be composed of nine members, including the chairman. The method of selection of said committee, its chairman, and spokesman, shall be left to the employees, and the company agrees to negotiate with accredited spokesman or representative of the employees, either through said committee or otherwise.

ANSWER. This is in accordance with practice and policy of the company and can be conceded with exception of the last two words.

SECTION 2. Any grievance or complaint which cannot be adjusted between the accredited representative of employees and the shop foreman may be referred to a higher officer of the company.

ANSWER. Conceded. This is present practice and policy of the company.

SECTION 3. The company agrees that there shall be no discrimination against any of the employees on account of services on said committee.

ANSWER. Conceded. This is strictly in accordance with Section 7A and is the law of the land.

Item 3

SECTION 1. Any employee who has been discharged or suspended by the company shall not be removed from the payroll until his case has been heard by both parties to this negotiation. Such cases shall be first taken up with the superintendent. If an agreement cannot be reached with the superintendent, the case shall be taken up with the general manager. If employee is judged not guilty and returned to work, he will be compensated for all lost time.

ANSWER. Any employee who has been discharged can appeal the case to the superintendent or to the general manager, either through the executive committee or personally. We contend, however, that the committee has no jurisdiction in the matter, that it can, however, act as a friend when requested, but has no judicial powers.

SECTION 2. The employer shall adopt the seven and one-half-hour day and the five-day work week.

ANSWER. Where a 3-shift operation is enforced this is standard practice. Where only two shifts are worked two nine-hour shifts, five days a week will continue to be the standard of our operation, there not being sufficient equipment available to handle it on any other basis.

SECTION 3. Seven and one-half continuous hours shall terminate a working day in any 24-hour period.

ANSWER. See Section 2.

SECTION 4. The regular quitting time shall be enforced at all times when an employee or group of employees are called to work after the adopted starting time of a shift.

ANSWER. This is agreed to and will, as we understand, permit of general change of shift starting time if necessity demands.

SECTION 5. An employee reporting for work and then sent home or refused work shall receive not less than two hours' pay, unless said employee was notified not to report to work.

ANSWER. We offer any employee reporting for work and then sent home one hour's time, expecting this to happen only in unfortunate circumstances.

SECTION 6. The work week shall begin on each Monday morning at 6 o'clock and end on the following Saturday morning at 6 o'clock thus giving 112½ working hours.

ANSWER. This is agreed to when three shifts of seven and one-half hours are worked but not otherwise.

SECTION 7. All time worked over the regular shift whether before or after the regular starting or quitting time shall be classed as overtime, and compensated at the rate of one and one-half (1½) times the regular rate of pay.

ANSWER. See Section 8.

SECTION 8. All legal holidays shall be compensated at the rate of two (2) times the regular rate of pay, and said holidays shall begin at twelve (12) o'clock midnight and continue for the following twenty-four (24) hours. The following days shall be considered as legal holidays, all Sundays; New Year's day, Washington's birthday, Memorial day, Fourth of July, Labor day, Thanksgiving day and Christmas.

ANSWER. Combined section 7 and 8. We offer to compensate all workers in the exempt class at the rate of time and one-half over forty-eight (48) hours per week. Should any productive workers be required to work on legal holidays as stipulated above, with the exception of Washington's birthday, such time will be paid for time and one-half.

SECTION 9. The committee shall be paid for all time on grievance work inside the plant.

ANSWER. This is agreed to in

principle but we must consult the legal phases of the question and our relationship with the automobile labor board at the moment. We believe, however, that payment can be granted at the regular hourly rate of each member of the committee.

SECTION 10. That a bulletin board shall be placed in each department for the use of this committee and the members of the United Automobile Workers Federal Labor union No. 18384.

ANSWER. It is against our policy to have anything but the company business on the plant bulletin boards which are not allowed but in limited number.

Item 4

SECTION 1. Seniority shall be established for all employees now on the payroll of the company, from the first hiring date (providing their service has been broken through no fault of their own).

ANSWER. This is not in accordance with present seniority rule under which we operate and cannot be granted, as seniority must be handled on a uniform basis on account of plant records.

SECTION 2. The committee shall act on all former employees discharged for all union activities.

ANSWER. The committee cannot act on matters arisen previous to its creation.

SECTION 3. No foreman or assistant foreman hired as such is to have any seniority rights over productive employees.

ANSWER. The committee has no jurisdiction over executives of the company in any way, shape or manner.

SECTION 4. The company shall give three (3) days' notice to all employees who are to be laid off.

ANSWER. The company offers to give twenty-four (24) hours' notice in any case and extend this if practical.

SECTION 5. When an increase in force is necessary, the older employees in point of service shall be called back first. Efficiency and practicability shall be determined by the executive shop committee.

ANSWER. When an increase in force is necessitated the older employees in point of service and with dependents will be called back first. The company recognizes only its own judgment in determining efficiency of its employees.

SECTION 6. The company agrees to furnish the executive shop committee with a seniority list of all employees on the payroll and to notify the committee of all employees laid off and also recalled to work.

ANSWER. The committee cannot have access to the total lists of all employees, we not knowing who is a member or non-member of the organization.

SECTION 7. Employees' names shall not be removed from the payroll for sickness, accident or any other cause, providing they notify the company and executive shop committee within three (3) days.

ANSWER. The company agrees not to remove any one from payroll, providing they notify the company in writing within three (3) days. No check by the shop committee is necessary. They are privileged to handle complaints if presented.

SECTION 8. In event an employee is sent home for lack of work or other causes no employee with less seniority shall be allowed to work on this job, except by approval of the committee.

ANSWER. Refused.

SECTION 9. The executive shop committee and shop committee shall head the seniority list.

ANSWER. This matter can be left open for further negotiation. Our compliance with present seniority rules makes it impossible for us to give a definite decision at this time.

Item 5

SECTION 1. The minimum wage shall be seventy (70) cents per hour, no employee shall receive less than a five (5) cents per hour increase.

ANSWER. This demand is without precedent, representing a 40 per cent increase over present minimum, which is in line with wages paid in the district. We offer a conditional blanket increase of five per cent in all brackets, from the lowest to the highest.

SECTION 2. No employees' hourly rate shall be reduced.

ANSWER. We offer — that if an hourly rate employee, due to lack of work, is placed on a job paying a lower wage, the minimum reduction given to his original rate will be 10 per cent.

SECTION 3. The committee shall have voice in retiming all jobs.

ANSWER. We offer, in order that everybody may know the time on any one job to furnish such information upon request to the proper department.

SECTION 4. No non-productive employees shall be compensated from the group earnings.

ANSWER. There are no men working on group earnings in our plant.

SECTION 5. All employees shall receive the same compensation as the highest paid employee doing the same kind of work, except by the approval of the committee.

ANSWER. Without making a definite commitment, we shall endeavor to reclassify out of balance rates to within 10 per cent of the higher bracket before applying conditional blanket increase as stated above.

SECTION 6. Pay day shall be every Friday on the job.

ANSWER. We will, if a majority of all our employees desire weekly pay checks, agree to have this done as soon as the necessary equipment and clerks can be arranged and payment will be made in regular cages placed throughout the shop.

Torsional Vibration a Bigger Problem in Diesel Crankshafts

TORSIONAL vibration of crankshafts is likely to be more troublesome in automotive Diesel than in carburetor engines, according to Dr.-Ing. K. Schlaefke, writing in *Mitteilungen aus den Forschungsanstalten* for February. This is due to the higher gas pressures attained. Dr. Schlaefke found, for instance, that the sixth harmonic of the gas-pressure torque has an amplitude corresponding to about 3.5 per cent of the i.m.e.p. in carburetor engines, and 2.9 to 5.6 per cent in automotive Diesel engines, varying with the form of the indicator diagram. With equal i.m.e.ps. the vibration-exciting forces therefore are 1.2 times as great in the Diesel as in the carburetor engine, on the average, but they may be 1.6 times as great. Up to a few years ago the i.m.e.ps. in carburetor and Diesel engines were in the inverse proportion, so that the exciting forces were about the same in both, but recently the i.m.e.ps. of Diesel engines have reached the same values as in carburetor engines (about 100 lb. per sq. in. b.m.e.p.). For this reason the stresses due to torsional vibration may be 50 per cent greater in a modern Diesel than in a carburetor engine. The author says he observed repeatedly that a carburetor engine would withstand temporary operation within the critical speed range corresponding to the sixth harmonic, while in the case of a Diesel engine with camshaft gears at the front, the latter would clatter so violently that even a short period of operation was impossible.

Ni-Resist for Heater Valves

FOR the heater valves of gasoline engine fuel systems the International Nickel Company recommends Ni-Resist, a machinable material which has a minimum growth at high temperatures. Plain cast iron valves will grow and rust at the high temperatures to which these valves are subjected, and the valves will stick in consequence. Ni-Resist is said to be used by a number of manufacturers to solve this problem.

Leaf Springs Used in New Four Wheel Independent Suspension Design

AN unusual system of independent wheel suspension on all four wheels is being demonstrated in Detroit by Wallace (Wally) Miller. It represents a development of a system introduced a number of years ago which was tested by a number of car manufacturers at the time.

The present job, in which the writer had a ride, is mounted on a 1934 Ford V-eight chassis, rebuilt at both front and rear to accommodate the essential details of the suspension. As shown in Fig. 1, at the front there are three leaf springs, one at the top and two below, spring weight being substantially the same as with the single spring normally used.

At the rear there are four springs, two above and two below, disposed in pairs about the rear axle. The standard differential carrier is rubber-supported on the frame at four points, in such a way as to give a practically straight-line drive. Drive to the wheels is through two shafts, each of which is fitted with two universals. To simplify the construction on this job, the experimental car is equipped with hydraulic brakes.

According to Mr. Miller, the chief feature of this design of independent springing is reduction of the unsprung weight. This in combination with springs of very low rate (about 75 lb. per in.) gives a remarkably smooth ride on poor, broken roads. The spring arrangement at both front and rear is said to have inherent stability and resistance to torsional deformation, and alignment is maintained without the use of radius rods or shackles.

The layout of the rear assembly is such that the differential can be removed as a unit by simply breaking three universal joints and removing the four attaching bolts. Each spring can be removed separately and each wheel carrier can be taken off without the removal of any of the springs.

Steering geometry of an unusual character is said to be inherent in this system, and, in fact, it is claimed that the steering arrangement is of a proprietary nature and covered by basic patents. As will be noted in Fig. 1, the drag link is located inside the frame and connects to a tee-head lever pivoted horizontally in the spring mounting bracket. Tie rods are articulated, with ball and socket connections at the tee-head, and run diagonally to the steering knuckles.

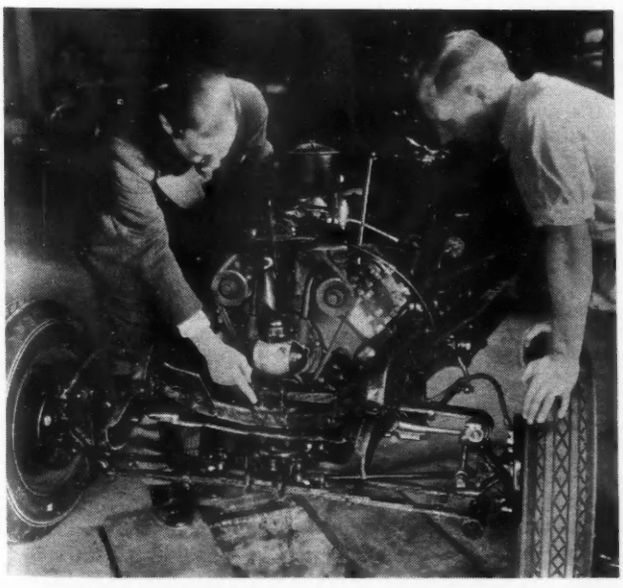
In driving the car over obstructions and bumpy road surfaces, we found an absolute absence of wheel fight, and steering called for relatively little effort on the steering wheel whether on bumpy roads or in making a turn.

It is, of course, difficult to gage the relative cost of building a conventional car as compared with the use of the system described here. However, it must be remembered that with this design the front axle is eliminated and the rear axle is simplified.

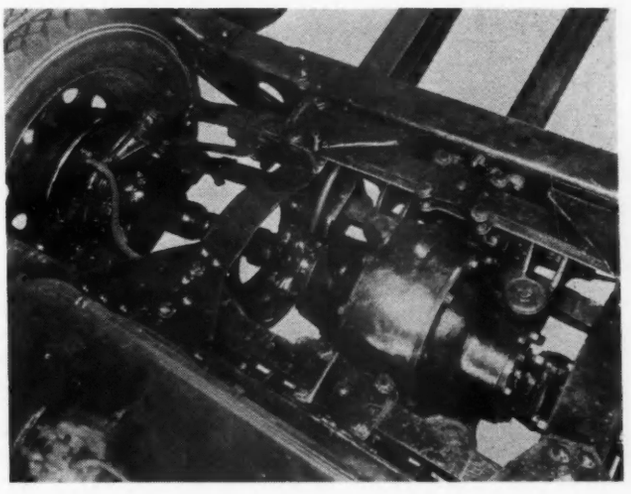
One of the outstanding features of the ride is that although no sway stabilizers are employed, the car apparently has no tendency to sway or lean on turns. Turns of small radius, such as the islands in Grand Boulevard in Detroit, were taken with ease and without noticeable change in the level of the vehicle.

The weight of the experimental car is 105 pounds more than that of the conventional car. Undoubtedly some of the excess weight is accounted for by the special attachments required to convert the standard chassis and may not be present in a chassis designed specifically for this type of suspension. The amount of unsprung weight is very low.

It is also claimed that since all sprung chassis and body weight is cradled on the two narrow mountings, and the total load is transmitted through the long flexible springs to the center of the frame, a lighter frame can be used.



The front suspension is shown at the left and the rear suspension at the right



AUTOMOTIVE ABSTRACTS

Swiss Build 134 Cu. In. Diesel

A SMALL high-speed Diesel engine for use in passenger cars has been built by Oberhansli & Co. of Bregenz, Switzerland. It is a four-cylinder engine of 75 mm. bore and 125 mm. stroke (substantially 3 by 5 in.), which gives a piston displacement of 134 cu. in., and it is said to develop 40 hp. at 2600 r.p.m. In order to eliminate the rather expensive centrifugal governor, the pneumatic governor developed by Bosch and described in *Automotive Industries* of March 23, is fitted. The engine is provided with a throttle in the intake passage, the same as a carburetor engine, which is controlled from the driver's seat. By means of the throttle the intake vacuum, and hence the amount of fuel supplied to the engine per cycle, can be changed. It was found that with the small cylinders of this engine a compression ratio of 17 to 1 was necessary. This gives a compression pressure of 600 lb. per sq. in., while the maximum combustion pressure is said to range between 675 and 750 lb. per sq. in. Although it is admitted that the engine can be further improved, many thousand miles are said to have been covered by vehicles equipped with it.—*Allgemeine Automobil Zeitung*, Feb. 9.

Racing Cycle Engine Gives 2 Hp. Per Cu. In.

IMPERIA, a German motorcycle-manufacturing firm, has developed a new motorcycle racing engine of 350 cu. cm. displacement which works on the two-stroke cycle and comprises a single cylinder with two pistons working on separate cranks which are connected by a two-strand roller chain. An extension of the upper crankshaft carries the rotor of the supercharging blower. The engine is said to develop 40 hp. at 5200 r.p.m. As the displacement is only a little over 21 cu. in., this makes nearly two horse power per cu. in.

Napier Expects Government Order for 24-Cylinder Engine

AT a recent stockholders' meeting of D. Napier & Son, Ltd., the chairman mentioned that the company expected a large Government order for its new Dagger engine. This is an air-cooled engine of twenty-four cylinders arranged in four banks of six and working on two crankshafts, which with maximum boosting will develop 760 hp. The frontal area of this engine is only one square foot for every 110 hp. The chairman said that while today we spoke in terms of 800-1000 hp. engines, as compared with 400-500 hp. only a few years ago, there were indications that the horse power limit for single engines had not yet been reached. Progress in the aircraft engine industry was very rapid and no one could say when some new discovery or development would come along which would necessitate a completely new outlook on the part of engine manufacturers.—*The Engineer*, March 8.

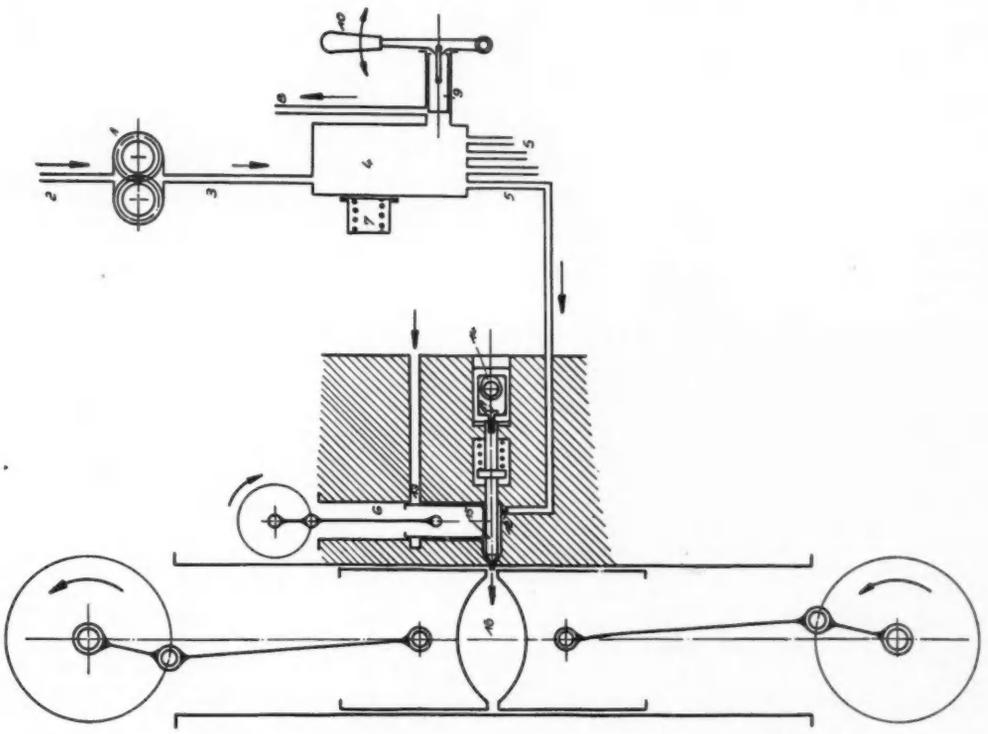
Prize for Diesel Plane

A PRIZE of 10 million francs ($666,000) is being offered by the French Air Department to a competitor beating the world air record over a circular course of 6250 miles in a plane equipped with a Diesel engine; if the record is not beaten by December, 1936, the prize will go to the maker of the engine attaining the best average speed over the same course, provided it is not lower than 180 km. (112 miles) per hour. If the engine is produced under foreign license, the prize is cut in half. On the other hand, if the best showing should be made by an engine built in a Government plant or arsenal, eight million francs will be paid to the competitor making the next best showing. All rights to the winning engine will go to the Government.

A New Fuel Injection System for Two-Stroke Gasoline Aircraft Engines

A SYSTEM of fuel injection for two-stroke aircraft engines running on gasoline is described by Walter Hofmann in a recent issue of a German contemporary. The system is illustrated diagrammatically by the sketch reproduced herewith. Fuel pump 1 (shown here as a gear pump) draws fuel through line 2 from the tank and delivers it through pipe 3 to the distributor and equalizing chamber 4. The amount of fuel delivered by pump 1 is substantially proportional to the engine speed. Lines 5 lead to the charge pumps 6 of the individual cylinders. Metering of the fuel charge injected into the charge pumps is controlled by means of the pressure in the distributor chamber. To this end the overflow pipe 8 is closed more or less by means of a throttling valve 9 which is interconnected with the throttle lever 10. Fuel is injected continuously into the compression space of the charge pump through the nozzle 12, in accordance with the law $Q = F\ C\ \sqrt{p}$. If the speed decreases the period of injection (through nozzle 12) increases in inverse proportion, but the amount of fuel delivered by pump 1 also decreases in direct proportion to the speed, so that the amount of fuel injected per cycle remains constant regardless of engine speed for a given position of the throttling valve 9 and of the throttle lever 10. The load-control characteristic is therefore the same as in a carburetor engine with throttle control and in a Diesel engine with injection control. A speed governor is necessary. Accuracy of quantity control is assured by the use of high pressures in the distributor chamber, small nozzle 12, and long periods of injection (in this case continuous).

The charge pump is provided with inlet ports which are controlled by its piston. Air from the supercharger or



scavenging pump flows through these ports into the charge pump. Owing to the great pressure difference existing when the piston uncovers the ports, the cylinder fills rapidly and completely. After compression of the air and the gasoline (which enters continuously through nozzle 12) to about 1000 lb. per sq. in. the spring-closed injector valve 15 is lifted by means of camshaft 14 and the charge of combustible mixture is discharged into the working cylinder 16. Timing of the injection into the individual cylinders is controlled by means of the device 17, the timing being changed by means of an axial motion of the camshaft, which is driven through helical gears. This control is effected automatically by the centrifugal governor in accordance with the engine speed. Ignition timing (spark plug) is changed automatically at the same time, the interval between the beginning of injection and the occurrence of the spark being maintained substantially constant.

In the past the objection has often been raised to this system of injecting a combustible charge that ignition would take place in the charge pump through the nozzle, or would be caused by the heat of compression in the pump cylinder; the inventor claims, however, that such ignitions are eliminated in his system by the smallness of the work required for injecting the more volatile fuels, the richness of the mixture in the pump cylinder, and the rapid cooling of the charge due to the smallness of the charge pump cylinder.

The author argues that in order to assure high weight efficiency, high output per unit of displacement, and high fuel economy, it is necessary to use small cylinders, high speeds, high compression ratios (as compared with those of carburetor engines) and the two-stroke principle. This is possible only with an efficient scavenging system as represented by uniflow scavenging with pure air, with injection of light fuels (together with spark ignition); that is, by means of an injection system which at the high speeds necessary (5000 r.p.m.) assures reliable operation with the diminutive amounts of fuel required per cycle, owing to the smallness of the cylinders.—ATZ, Dec. 10.

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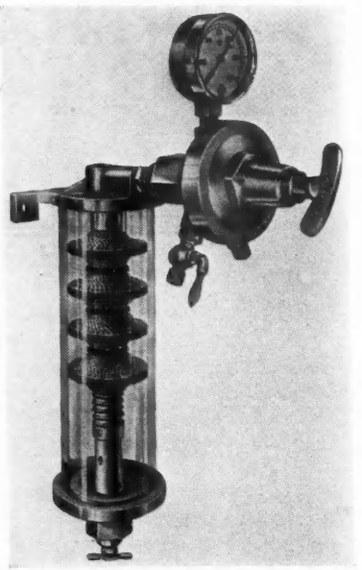


Gas Tractor Equipped With Pneumatic Tires

Mercury Manufacturing Company, Chicago, Ill., announces a new Type "D" gas tractor equipped with large-size pneumatic tires front and rear to provide increased traction and a cushioning effect when operating over rough roadways, in yards, up grades, and in similar operations.

Overall length of 86 in., width 60 in., and outside turning radius 115 in.

Single and Double Stroke Open Die Cold Headers

The National Machinery Co., Tiffin, Ohio, has announced a new line of open die cold heading machines in all sizes. The new header is very similar in design and operation to National solid die machines, but the addition of a relieving grip motion enables these machines to operate either as relieving grip or solid die machines. This provides greater versatility and they will produce long or short, open or solid die work with equal facility—all of which can be extruded during heading for roll threading.

It is only necessary to change the stroke of the wire feed and adjust the position of the knockout pin to make all lengths in the same die within the range of the machine. This greatly reduces the investment in dies, because it is unnecessary to have a separate die for each different length of bolt. In addition, die life is greatly increased, and the quality of open die work vastly improved. There is almost a total absence of part line fin; the heads are central, and the diameter under the head is accurate and uniform.

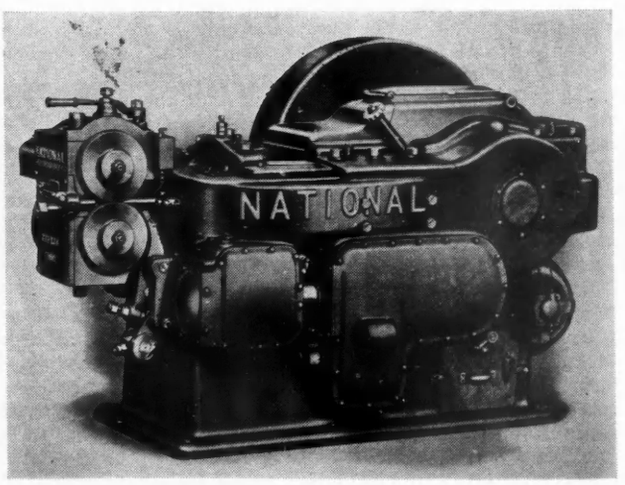
In the National type open die header that portion of the shank to be roll threaded can be reduced by the process of extrusion simultaneously with the heading. The extrusion bush is gripped and held in proper alignment with the dies, and when the gripping pressure is relieved, the bush is free so that the blank can be ejected without any cramping tendency. This feature is patented.

Gas and Air Purifier

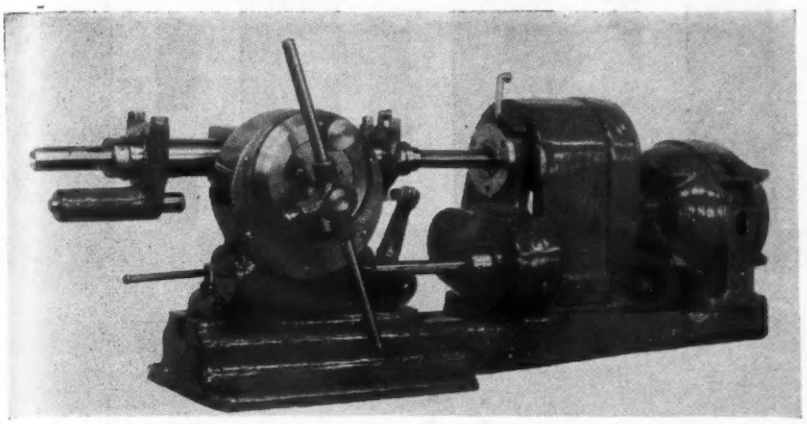
A unique purifier for conditioning air or gas has just been announced by the Alexander Milburn Company, Baltimore, Md. It is radical in design, having a glass shell through which accumulated oil, moisture or dirt can be readily seen, enabling the user to quickly determine when cleaning is necessary.

A series of perforated plates and strainers remove foreign substances from air or gas lines, ensuring at all times a clean, moisture-free flow for paint spraying, welding or any other similar operations. It is particularly desirable for paint spray equipment where the air to the spray gun must be conditioned dry and clean at all times to prevent spotting of work.

The purifier has very few parts and can be disassembled quickly and easily for cleaning. It is equipped with a full size, 3-in. diaphragm regulator having a graduated gage.



This National cold heading machine has versatility



four pounds and is 7½ in. long.

This drill features a special system of ventilation passing more of the air and exhaust againset the work and away from the operator. A screened intake is used to exclude dirt and chips. There is a hand-fit handle and the tool is said to be in perfect balance.

An Acknowledgment

The "Dum Dum" material referred to in our recent article on Budd all-steel roof development work, is the product of the Arco Co., Cleveland, which holds a copyright on this trade name.

Edlund Adds to Line of Drill Machines

The Edlund Machinery Co., Inc., Cortland, N. Y., has supplemented its line of drilling machines by the addition of hand feed and power feed individually motor driven drill units. These units may be mounted vertically, horizontally or at an angle for drilling holes in different planes from the main machining operation or may be used in groups for drilling two or more holes.

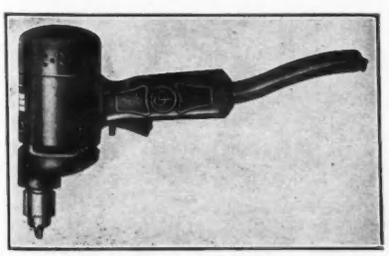
The spindle is driven from a motor through a pair of helical quick change gears and a two-spline broached quill. On the power feed unit a four step cone pulley is mounted on this quill for driving the power feed machanism. As the drill is advanced and comes in contact with the work the feed automatically engages. A dial gage is provided to determine the depth to be drilled before a stop disengages the feed and the spindle returns. The feed may be disengaged at any time by raising the feed lever.

The hand feed units is the same as the one shown in the accompanying photograph with the elmination of the feed box and pulleys.

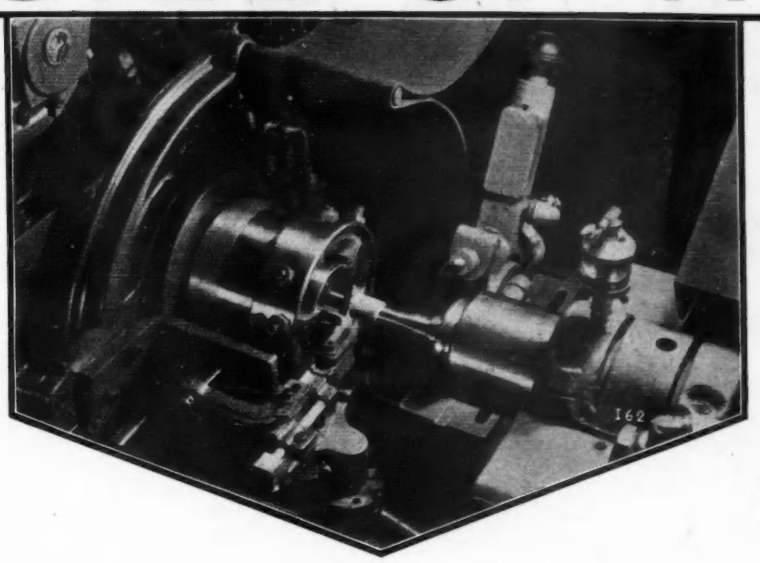
This unit has a capacity of ¾ in. in steel and a spindle speed range from 360 to 3000 r.p.m. Feeds of .002, .0035, .006 and .010 per revolution are provided.

Chicago Universal Electric Drill

Chicago Pneumatic Tool Co., New York, N. Y., has brought out the model No. 815 high speed universal electric drill for drilling up to 3/16 inch holes in light metal and wood. It weighs only



THAT'S THE SIZE OF IT



You can be certain it is. The size the drawing called for. Within the limits specified. What's more, each successive piece will be to size with like accuracy.

The reason for all this is the Landis-Solex Sizing Device—an outstanding feature of the new Landis Type C 15″x8″ Hydraulic Internal Grinder. This device is accurate within exceedingly close limits. Automatic in operation of course. May be used for straight or tapered holes, whether open or blind. Is highly flexible, easily set.

There is more about it in your copy of catalog E-35. 193

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